# Vol. II

## TRANSCRIPT OF RECORD

## Supreme Court of the United States

277

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OCTOBER TERM, 1927

## No. 285

HOLLAND FURNITURE COMPANY, PETITIONER,

*vs.*

PERKINS GLUE COMPANY

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE SIXTH CIRCUIT

649

PETITION FOR CERTIORARI FILED JUNE 8, 1927

CERTIORARI GRANTED OCTOBER 17, 1927

(32,737)

# (32,737)

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## VOLUME II

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[fol. 598 & 599] IN UNITED DISTRICT COURT

FINAL DECREE

This case having come on to be heard on rehearing after reopening to permit defendants to introduce further evidence and proofs in the case, and the Court being fully advised in the premises it is

Ordered, Adjudged and Decreed as follows:

First. That reissued Letters Patent of the United States, No. 13436, are good and valid as to claims 13, 28, 30, 31 and 38 thereof, and that the Perkins Glue Company, plaintiff herein, is the sole and exclusive owner of said Letters Patent and of all rights and privileges secured thereunder, and also of all claims and demands whatsoever arising from infringement of said Letters Patent.

Second. That the defendant Holland Furniture Company has not infringed upon the exclusive rights accrued to plaintiff by said reissued Letters Patent No. 13436 by employing processes and making and using products wherein the starch base used was furnished to defendant by the Kane Manufacturing Company of Chicago and is known herein as the Kane base.

Third. That the said Holland Furniture Company defendant has infringed upon the exclusive rights secured to plaintiff by said reissued Letters Patent No. 13436 and particularly as to claims 13, 28, 30, 31 and 38 thereof, by employing processes and making and using products wherein the starch base used was purchased by defendant from Solva Waterproof Glue Company and from International Process Company.

Fourth. That no profits have accrued to the defendant Holland Furniture Company by reason of said infringement.

Fifth. That a perpetual injunction be issued out of and under the seal of this Court against the said defendant, the Holland Furniture Company, enjoining and restraining it, and its officers, directors, servants, agents, attorneys, associates, successors, confederates, salesmen, workmen and any person acting for or on behalf of said defendant, from using processes and from making, using or selling products

in infringement of said Letters P tent, and from directing or contributing to or aiding or abetting any such infringement by others.

Sixth. That neither party recover costs; each party to pay its own costs.

C. W. Sessions, United States District Judge.

Approved as to form Mar. 17, 1924.

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[fol. 600] In United States District Court

Petition on Appeal—Filed Sept. 9, 1924

The above named Plaintiff, Perkins Glue Company, a Corporation of Delaware conceiving itself aggrieved by the final decree made and entered in the above entitled cause on or about the 17th of March, 1924, hereby appeals from said decree to the United States Circuit Court of Appeals for the Sixth Circuit for the reasons specified in the assignment of errors filed herewith and prays that this appeal may be allowed and that a citation may issue directed to the defendants commanding them to appear before the United States Circuit Court of Appeals for the Sixth Circuit to do and receive what may appertain to justice to be done in the premises, and that a transcript of the record, proceedings and papers upon which said decree was made, duly authenticated, may be sent to the United States Circuit Court of Appeals for the Sixth Circuit.

Perkins Glue Company, by Knappen, Uhl & Bryant, Solicitors. Gorham Crosby, of Counsel.

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In United States District Court

Order Allowing Appeal

The foregoing appeal is hereby allowed this 9 day of Sept. 1924 and the Plaintiff ordered to file a cost bond in the sum of Two Hundred and Fifty Dollars ($250.00) with surety to be approved by the Clerk of this Court, to secure the defendants their costs on appeal.

C. W. Sessions, U. S. Judge.

[fol. 601] IN UNITED STATES DISTRICT COURT

ASSIGNMENT OF ERRORS—Filed Sept. 9, 1924

And now comes the plaintiff in the above entitled cause and says that in the record and proceedings therein, there is manifest error in this, to wit:

1. The Court erred in decreeing that the defendant, Holland Furniture Company, has not infringed upon the exclusive rights accrued to plaintiff by Reissued Letters Patent No. 13436, by employing processes and making and using products wherein the starch base used was furnished to defendant by the Kane Manufacturing Company of Chicago and is known herein as the Kane base.

2. The Court erred in not decreeing that the defendant, Holland Furniture Company, has infringed upon the exclusive rights secured to plaintiff by said Reissued Letters Patent No. 13436 and particularly as to claims 28, 30 and 31 thereof, by making and using products wherein the starch base used was furnished to defendant by the Kane Manufacturing Company of Chicago and is known herein as the Kane base.

3. The Court erred in decreeing that no profits have accrued to the defendant, Holland Furniture Company, by reason of said defendant's infringement of said Letters Patent.

4. The Court erred in not confirming the Masters Report and in not decreeing that the Defendant, Holland Furniture Company purchased and used 121,149 pounds of glue base because of the use of which it infringed the product claims of the Plaintiff's patent in suit and that its savings because of said infringement amount to $30,802.55.

5. The Court erred in not decreeing that defendant Holland Furniture Company pay to the plaintiff the said sum of $30,802.55 together with interest thereon from the date of the Master'- report.

6. The Court erred in decreeing that neither party recover costs; each party to pay its own costs.

7. The Court erred in not decreeing that Plaintiff recover its costs to be taxed by the Clerk.

8. The Court erred in not decreeing that plaintiff have judgment and execution for the sums above mentioned to be paid to it by defendants.

Knappen, Uhl & Bryant, Solicitors for Plaintiff.
**Gorham Crosby, of Counsel for Plaintiff.**

[fol. 602] Bond on appeal for $250.00 omitted in printing.

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[fol. 603] Citation in usual form, showing service on Wm. H. Davis, omitted in printing.

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[fol. 604] IN UNITED STATES DISTRICT COURT

STIPULATION RE TRANSCRIPT OF RECORD

It is hereby stipulated and agreed by and between counsel for the respective parties, that the printed transcript of record on plaintiff's appeal herein, shall consist of the pleadings, testimony, exhibits and papers, as follows:

Vol. 1

1. Bill of Complaint.
2. Defendants' Answer.
3. Interrogatories to Defendants (Pltf's. Ex. 15).
4. Answer to said Interrogatories (Pltf's. Ex. 16).
5. Amendment to said Answers (Pltf's. Ex. 17).
6. Stipulation of April 18, 1921 (Pltf's. Ex. 1).
7. Stipulation of April 5, 1921 (Pltf's. Ex. 18).
8. Statement of testimony adduced at the trial:
(a) Testimony of William M. Grosvenor (Prima facie).
(b) Testimony of A. N. Grossman.
(c) Testimony of Carl Brush.
(d) " " Arthur Schepel.
(e) " " John Erickson.
(f) " " W. M. Grosvenor, recalled in rebuttal.
(g) Testimony of A. N. Grossman, recalled.
9. Statement of Evidence introduced under stipulation from the case of Perkins Glue Company vs. West Michigan Furniture Co. et al.:
(a) Testimony of J. B. B. Stryker.
(b) " " Frank B. Shields.
(c) Deposition of Glover M. Birk.
(d) Deposition of Presley M. Stewart.
(e) Testimony of W. M. Grosvenor (prima facie).
(f) Testimony of George P. Hummer.

(g) Testimony of R. C. Wendt.
(h) " " Otto Kreiger.
(i) " " J. H. Veneklaasen.
(j) " " Chas. C. Pennington.
(k) " " P. C. Huntley.
(l) " " Robert M. Birk.
(m) " " Fred E. Hood.
(n) " " Charles Worfel.
(o) " " Carl S. Miner.
(p) " " W. M. Grosvenor, recalled in rebuttal.

[fol. 605] 10. Notice of Sept. 22, 1919 (Pltf's. Ex. 10).
11. Reply to said notice (Pltf's. Ex. 11).
12. Notice (Pltf's. Ex. 12).
13. Disclaimer (Pltf's. Ex. 20).
14. Starch Diagram (Pltf's. Ex. 22).
15. Armour Glue List (Pltf's. Exhibit).
16. Forest Prod. Lab. Bulletin (Defts.' Ex. C).
17. " " " " (Defts.' Ex. D).
18. Reissue Letters Patent 13,436 in suit (Pltf's. Ex. 2).
19. Marsden U. S. Patent 376,445 (Defts.' Exhibit).
20. Higgins " " " 579,827 " "
21. Higgins " " " 642,329 " "
22. Cerf " " " 698,632 " "
23. Anderson " " " 769,289 " "
24. Haake " " " 813,647 " "
25. Roret Article on Apparatin (Defts.' Ex. R) translation.
26. Gerson & Sachse German Pat. 167,275, translation (Defts.' Ex. 5).
27. Kantorowicz German Patent 88,468, translation (Defts.' Ex. T).
28. Bredt German Patent 156,148, translation (Defts.' Ex. U).
29. Haake German Patent 164,385, translation (Defts.' Ex. V).
30. Bellmas German Patent 110,957, translation (Defts.' Ex. W).
31. Bellmas German Patent 118,089, translation (Defts.' Ex. X).
32. Witt German Patent 88,447, translation (Defts.' Ex. Y).

33. Brueder German Patent 114,978, translation (Defts.' Ex. Z).

34. Pages from periodical "Glue" (Defts.' Ex. A-A).

35. Perkins U. S. Pat. 1,109,144 (Pltf's. Ex. 23).

36. Perkins U. S. Pat. 1,238,810 (Pltf's. Ex. 24).

37. Brooks U. S. Pat. 779,583 (Defts.' Exhibit).

38. Herzberg British Pat. 12,326 of 1897 (Defts.' Exhibit).

39. Dornemann French Pat. 232,781 (Solva translation) (Deft's. Exhibit).

40. Calico Printers French Pat. 366,903, translation (Deft's. Exhibit).

41. Opinion of the Court, filed July 6, 1921.

42. Interlocutory Decree entered Aug. 5, 1921.

43. Defendants' Petition and Order Allowing Appeal Aug. 31, 1921.

44. Defendants' Assignment of Errors Aug. 31, 1921.

[fol. 606] 45. Solva Case decisions, etc.:

(a) Petition for rehearing in Solva Case.

(b) Appellees' reply thereto in Solva Case.

(c) Petition for rehearing denied in Solva Case.

(d) Mandate in Solva Case.

(e) Memo for final decree in Solva Case.

(f) Final decree in Solva Case.

(g) Injunction in Solva Case.

46. Reopening Order of July 26, 1923.

47. Stipulation of August 22, 1923.

48. Exhibits accompanying same as follows:

(a) Translation of Gerard Belgian Patent.

(b) Dornemann French Pat. 232,781.

(c) Translation of Dornemann French Patent 232,781.

(d) Translation from German Handbook.

49. Accounting Proceedings:

(a) Master's order to defendants.

(b) Statement of testimony adduced before the Master.

(c) Exhibits offered before the Master:

(1) Deft's. first statement filed with Master.

(2) Pltf's. Ex. 1, of Sept. 22, 1921.

(3) Stipulation re introduction of testimony from Perkins v. Fred E. Hood et al. Case, with attached schedule.

(4) Pltf's. Ex. 3 of Jan. 10, 1921.

(5) Pltf's. Ex. 3 of Jan. 12, 1921.
(6) Pltf's. Ex. 1 of Jan. 19, 1921.
(7) Pltf's. Ex. 2 of Jan. 19, 1921.
(8) Pltf's. Ex. 1 of Jan. 11, 1921.
(9) Copies of U. S. Patents 1,078,691, 1,078,692, 1,200,488, 1,299,705, 1,299,809; Deft's. Exhibits 1, 2, 3, 4 and 5 of Nov. 10, 1921.
(d) Report of Master of Nov. 9, 1922.
(e) Defendant's Exceptions to Master's Report.
50. Final decree of Mar. 17, 1924.
51. Petition and Order allowing appeal.
52. Assignment of Errors.
53. Cost Bond on Appeal.
54. Citation.
55. This Præcipe—Stipulation.
56. Order Reviving Case of Sept. 4, 1924.

[fol. 607] Vol. II

57. Evidence Introduced from the Case of Perkins Glue Co. v. Solva Waterproof Glue Co. et al. (U. S. Dist. Court, Northern Dist. of Illinois, Eastern Div.) as found in Vol. II of the Printed Record on Defendant's Appeal in the Case of The West Michigan Furniture Co. et al., Appellants, vs. Perkins Glue Co. Appellee, No. 3544 in the U. S. C. C. A. Sixth Circuit.
58. File Wrapper contents of original Perkins Patent 1,020,655.
59. Stipulation as to correctness of transcript of record.
60. Certificate of Clerk.

Gorham Crosby, Counsel for Plaintiff. James A. Watson, Counsel for Defendants.

Dated Sept. 30, 1924.

So ordered and the clerk is directed to certify the record accordingly without any further approval thereof by the Court or Judge.

C. W. Sessions, U. S. Judge.

[fol. 608] In United States District Court

Order Reviving Cause

Whereas it has been represented to this Court that the Plaintiff, Perkins Glue Company, a corporation of Pennsylvania, did on or about the 1st day of August, 1924, sell, assign and transfer to Perkins Glue Company, a corporation organized and existing under and by virtue of the laws of the State of Delaware, its successors and assigns, the entire right, title and interest in and to the Reissued Letters Patent 13436 in suit, and the inventions covered thereby, including all rights and claims to damages and profits that have resulted by reason of any and all infringements of said Letters Patent, with all rights and claims now in litigation with respect thereto and also the right to sue and collect the same in its own name, whereby this suit became abated.

Now, Therefore, on motion and petition of said Perkins Glue Company, a Delaware Corporation, and after considering the attached consents of defendants and of the said Perkins Glue Company, a Pennsylvania Corporation, by their respective counsel, it is

Ordered, Adjudged and Decreed that this cause be and hereby is revived with said Perkins Glue Company, a Delaware Corporation, substituted as plaintiff herein for said Perkins Glue Company, a Pennsylvania Corporation, to the same extent and purpose as if it had been the original plaintiff herein, and that all orders, decrees and other proceedings heretofore had herein stand for or against the said Perkins Glue Company, a corporation of Delaware, and the defendants, respectively, in the same manner and to the same effect as they applied to the original plaintiff, said Perkins Glue Company, a corporation of Pennsylvania, and defendants, respectively, prior to said abatement.

C. W. Sessions, U. S. Judge.

Dated September 4, 1924.

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[fol. 609] Appearance of counsel, filed October 4, 1924, omitted in printing.

Minute entry of argument and submission January 5, 1926, omitted in printing.

In United States Circuit Court of Appeals, Sixth Circuit

Appeal from the District Court of the United States for the Western District of Michigan

Decree—Filed March 18, 1927

This cause came on to be heard on the transcript of the record from the District Court of the United States for the Western District of Michigan, and was argued by counsel.

On Consideration Whereof, it is now here ordered adjudged and decreed by this Court that the decree of the said District Court in this cause be and the same is hereby reversed with costs and the cause remanded to the said District Court with directions to take further proceedings consistent with the opinion of this Court.

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[fol. 609–] In United States Circuit Court of Appeals

Before Denison, Mack, and Moorman, Circuit Judges

Opinion—Filed April 2, 1927

Denison, C. J.:

This case relates to glue. Until recently the word implied an animal substance base. The Century Dictionary so defines it, and does not include any vegetable composition, save by a reference to gum arabic,—although the patent art shows an occasional use of "vegetable glue." Various adhesives had been made with a starch base, running from a sticky mass, through stages of dilution, to a highly fluid, slightly adhesive, sizing. In common understanding, glue, paste and mucilage were fairly distinct families. Glue was largely used in furniture and similar arts, and especially in veneering, in which relatively large sheets of wood were to be fastened together, commonly in several very thin layers. It was necessary that the bonding material should be spread, by hand, brush or machine roller, over large surfaces very quickly, thinly and evenly, and that, when set, the bond should be exceedingly strong. Hence its essential qualities must be a high degree of fluid-

ity for application, and extreme tenacity when set. Glue—animal glue—had these qualities, and to speak of animal glue, or to say "as good as animal glue", was to imply them.

Perkins was, beyond dispute, the first (disregarding now the purely paper references)—to make successful starch glue, suitable for veneering and similar uses. He described it as being "as good as animal glue" and it proved to be. It was rapidly and generally adopted by the furniture and veneering industry, was cheaper and more easily used than animal glue, and even more effective in the firm bonding of wood or fiber surfaces. In a practical and commercial way, Perkins was a pioneer, and his discovery was one of importance. As a supposed inventor, he is entitled to whatever credit and presumption the law infers from striking, and in a sense revolutionary, commercial success.

His basic material was starch, and it seems to be accepted all around that cassava starch has qualities which make it [fol. 609–2] the best for this purpose. This is made from the cassava root, which manufacturers, in the tropical countries where it grows, grind, dry, wash, bleach and otherwise treat to put it in the condition in which it comes upon the market here, and is commonly called by the rather vague name "raw cassava starch". In this form it may have varying degrees of viscosity,—a term expressing the inherent inter-molecular friction of the material, dependent upon its water-absorbing capacity and usually measured according to testing apparatus used after mixing with water. It was known (though very likely not to Perkins) that this inherent degree could be lessened by artificial treatment, called degeneration. By the use of acid and heat, in very limited amounts, Perkins lessened the capacity of the starch molecules for water absorption, but was careful not to carry the treatment far enough to change the starch into dextrine or to dissolve it,—which with the subsequent treatment, would have produced paste, mucilage or sizing. The subsequent treatment, also broadly well known, consisted in dissolving in water, with caustic soda or similar digestant, the cellulose of the starch molecules. Thus the primary starch and water mixture was converted into a new compound which had customarily been one of those weaker adhesives, and which by Perkins' treatment became glue. Because

the starch water-absorbing capacity had become relatively small, a small amount of water would make a fluid mixture, so that it could be properly applied, and yet the necessary tenacity would remain. Water enough otherwise necessary to give fluidity woud have produced a dilution with relatively poor tenacity, like the old pastes, and, when applied to wood, requiring a long drying, and leaving little bonding material permanently in the joint. Perkins' glue was quickly dried and was so adhesive that, on pulling apart, the wood itself frequently gave way while the glue held.

To get the monopoly contemplated by the patent law Perkins obtained a patent dated March 19, 1912, which was almost immediately reissued as Reissue No. 13436, dated July 2, 1912, upon "Glue and Method of Making the Same." It has 38 claims, divisible into groups,—one group covering the so-called glue base, the product [fol. 609-3] of the first described, or degenerating step; one group relating to the process of making this base,—the first step process; one group covering the process of dissolving the base,—the second step; another drawn upon the double or two step process; and still another group based upon the ultimate product, the glue itself. Three claims selected out of this ultimate-product group, are the only ones now in suit,—28, 30 and 31. They are as follows:

"28. A glue comprising cassava carbohydrate rendered semi-fluid by digestion and having substantially the properties of animal glue.

30. A wood and fiber glue formed of a starchy carbohydrate or its equivalent by union therewith of about 3 parts or less by weight of water and alkali metal hydroxid.

31. A wood and fiber glue containing amylaceous material as a base dissolved without acid in about three parts of water or less, and being viscous, semifluid and unjellified."

Of these the broadest is perhaps 28; but it appears that a glue, thus composed, will not have "substantially the properties of animal glue," unless containing only the critically small amount of water specified in claim 30. It also appears that an article which is a wood and fiber glue, as distinguished by the specification from other things, will be "viscouse, semi-fluid and unjellified," as specified in claim 31. However for the purposes of this case, claim 30 may be taken as the claim in suit, and the other two will

stand or fall with it. Neither as to validity or infringement is there vital difference.

If this claim is to be interpreted at its face value, infringement can not be,—indeed is not,—questioned. The defense primarily urged is that the specified process or processes, must be so far implied in the claim that defendant does not infringe. This is not the ordinary rule. From the Goodyear case, 9 Wall. 788, 796, to the Leeds & Catlin case, 213 U. S. 301, 318, it has been laid down that a new process and its product are separate inventions (and see our review in Dunn v. Toronto, 259 Fed. 258); and protection was given by separate patents or by differing claims in one patent, as the Patent Office rules of practice have from time to time provided. Normally, a new process [fol. 609-4] may result in several products in addition to that one which is new and which is patented. Normally, a new product may be made as well by some old process, or by some new method, other than the one patented. Those cases are exceptional where process and product are necessarily mutually inherent, and are inseparable, "like the two sides of a sheet of paper." Among applications of the general rule are General Co. v. Laco-Phillips Co.—C. C. A. 2—233 Fed. 96; Proctor v. Berlin—C. C. A. 2—256 Fed. 23; Maurer v. Dickerson—C. C. A. 3—113 Fed. 870; Baker v. Refractories Co.—C. C. A. 3—253 Fed. 741.

Where a new process brings a new product, that is, one never made before by any process, there may be difficulty in separating the mental conceptions of the two or in describing either except in the terms of the other. If that difficulty is insuperable, it perhaps demonstrates that there is only one invention; but theory and practice alike require that if there are two patents, or separate claims for the two inventions, there should be claim-identification by which each claim is expressed with substantial independence of the other. Claim 30 fairly meets the test. In the two phrases "formed of" and "by union" there is a suggestion of reference to method, but only a suggestion; the substantial reference is to the constituents which make up the finished product, and is without dependence on the method by which they are combined. The process might, and by the specification does, more or less involve temperature of the water, degree of slowness in adding the starch

base, strength and quantity of the alkali, violence and time of agitation, etc. Some of the process claims do incorporate such methods; some do not. For example,—claim 10 (not in suit) says: "The process of making glue which consists in dissolving cassava carbohydrate in caustic alkali until a glue is formed, as distinguished from mucilages, sizes and paste." This specifies no possibly new process except by reference to the resulting product, and hence it can not be distinguished from a product claim; but the result is, not to impeach the corresponding and properly formulated claim for the article produced, but to invalidate the process [fol. 609-5] claim, which reached for something it could not lawfully grasp.

Upon the whole, and upon the face of the patent, we see no reason to doubt that claim 30 is a valid product claim, properly expressed, covering what it identifies, and not limited by any forced importation of process. If so, it is immaterial that defendant may not use the process steps, either of them; and infringement is not to be doubted.

We understand defendant to contend at this point that although claim 30 is not limited to any specific starch base, we must, to save the claim, imply a limitation by starting with the product of the first step. We do not agree. We are analyzing a result into its elements. Not to save from anticipation, but to make operative and intelligible, there is an implied limitation to that base which, when combined as stated, will give the result stated. In other words, out of the variety of starchy carbohydrates we must select one suitable for this combination. In this there is no forbidden vagueness, for the specification teaches that starch is suitable when its water-absorbing capacity is not too high nor too low, but is in what we may call for convenience the medium range. It can not be said that Perkins put any absolute limits on this range. He was not obliged to do so, and he carefully refrained. He warned that the degeneration must not be carried to the point of disintegration, or of starch solution (line 45, p. 2); but he states no maximum or minimum limit, purposing rather that this water-absorbing power can be "regulated" (line 68, p. 3). So far from supposing that he must use his first step and carry it to a definite point was he that he said he could start the second step, though not as well, with "certain

grades of untreated cassava" (line 81, p. 3)[1]. He then gives a method of testing his proposed base to find whether it is sufficiently degenerated to suit him, the 9 to 1 boiling test (line 125, p. 3); but he introduces this by saying (line 121) "one way which has been found satisfactory for de- [fol. 609-6] termining, etc., is." As to the other test which he suggests, the 170 degree test, he says (line 74, p. 4): "Also in actual practice I have found that a good glue is produced by treating the base with the chemicals to reduce the water-absorbing power to a point where etc." It seems to be true that the "raw starch" which defendant uses as the base of the process by which it makes its glue is not within the limits of inherent viscosity indicated by either of these operations, although it clearly is within that medium range which is essential to the result. We think this not important in considering the construction of the patent on its face. To confine the base to these two suggested examples (they are examples, not tests) would be to rewrite the specification.

Coming to the next point in the discussion,—defendant says that it is buying an ordinary raw starch on the market, as it rightly may, and dissolving it into glue by an old process, as it rightly may, and thereby gets the product it is using in its veneering work. This is to say that claim 30 (construed as we do) is invalid for lack of invention. No one knows just why it is that no brand of cassava starch which Perkins could buy about 1908 could be used until after artificial degeneration, while defendant finds that some present regularly marketed raw starch makes a satisfactory base for the second step. It may be that changed methods of cultivation or manufacture have brought the viscosity down to the medium range; it may be that peculiarities of defendant's dissolving operation take the place of Perkins' preliminary treatment. In former litigation on this patent, it has been thought a controlling thing that nature, since Perkins' invention, had evolved a substitute for his artificially degenerated base, but we see no im-

[1] This was perhaps merely prophetic, because the record indicates that he had not found any raw starch which would perform properly for his second step; but he was at least guarding as well as he could against the possibility that there might be, or might later come into the market, some usable raw starch.

portance in the subject. The utmost effect of defendant's claim would be to make the situation the same as if the present base used by defendant, the Kane base, had been as freely for sale in 1910 as it is today; and this is practically the situation created by the now conceded fact that Perkins' base, product of his first step, was old at the time of Perkins' work. In former litigation it has been held that Gerson and Sachse, by their German patent, had disclosed substantially Perkins' first (degenerative) step [fol. 609-7] and his resulting glue base. Perkins acquiesced in this result, and disclaimed wholly those claims which covered the first step process or the glue base product. Hence the question must be: "Was there invention in taking this known starch base, which had the essential degree of viscosity, and making a real glue out of it, as Perkins for the first time did?" We see no sufficient reason for a negative answer. The art is full of instances where a starch base had been dissolved with an acid or alkali in a water mixture, but no one had ever made thereby a successful or useful wood or fiber glue; nor has any one since been able to make such a glue, using only the instructions found in the prior art. The results had been—with a little water—a pasty jelly, unworkable and useless as a glue, or,—with much more water,—a thin paste, mucilage or sizing, also useless as glue. Whether Perkins reasoned it out or stumbled on it, he was the first to discover that by taking a starch of then peculiar qualities he could dissolve it in less than three parts of water, and get a product both fluid enough and strong enough to be a practical and useful glue for all purposes requiring glue, not paste. This same Gerson and Sachse patent is the nearest thing along this line. They did not much detail how to use their glue base after it was made, but they said it might be dissolved in water, 5 to 100, with 2 per cent of caustic. All agree that this would give a sizing suitable for filling a fabric, but worthless for joining wood. It gives, at the best, a strength of 300 to 400 pounds to the inch, while an effective wood glue required 1,000; and both Perkins and defendant get 1,500 to to 2,000. In no accurate sense can this sizing be called the glue product of the Perkins patent. It is distinguished by the critically different quantity of water in the composi-

tion, and by the lack of the characteristics of a wood and fiber glue, respectively defined in the specifications.

It is said that those who had used a high viscosity starch base with a small amount of water had the right to use any known quality of starch, and that those (like Gerson and Sachse) who had used starch of a medium range in viscosity, with large quantities of water, had the right to use any amount of water, more or less. Of course they had. [fol. 609-8] Non sequitur that there was necessarily no invention in selecting and uniting the peculiar base of one and the peculiar water quantity of the other. Patents are commonly granted, and sustained, for just that type of selecting and uniting mechanical elements, when they bring a long-sought and strikingly useful result which gets wide acceptance and use. Much more should it be so with chemical reactions, often not fully foreseen.

If the right of a prior inventor to vary proportions, sizes and relations in his article as much as he pleases barred a patent to a subsequent worker who did make the variation which the first man had not done, many familiar decisions are wrong. In the Minerals Separation case, 242 U. S. 261, and 250 U. S. 336, the earlier inventors had used oil in varying quantities, and had the right to use less than one per cent. The patentees first observed that with less than one per cent they got a much better result. Eibel's predecessors (261 U. S. 45) had flowed the fluid paper pulp down a screened incline with an elevation of three inches. He raised the upper end nine inches, making the incline twelve instead of three, and thereby made as good paper at a faster rate. He did not merely observe that the steeper the hill the faster water would run down it; he saw that an existing trouble would be cured by a faster flow. So with Perkins. He did not merely observe that if he used less water than Gerson and Sachse he would get a thicker paste; he saw and developed the reason why he could use a very little water, and get something never before obtained,—a starch-base wood and fiber glue. His conception and development of the interactions of his selected starch base and the alkaline solvent with the water minimum, and his creation thereby of a new product, following years of commercial need for and unsuccessful effort to devise such a product, followed by the general adoption by the industry, seem to

us to meet and satisfy the universally accepted tests of invention.

We have so far proceeded on the assumption that Perkins was the first to make from starch a product properly called a wood and fiber glue, as distinguished from pastes, jellies and mucilages. Is this assumption justified by the [fol. 609–9] record? The alleged public use by Perkins for more than two years was carefully considered in the Solva case (infra), and was held ineffective because it was composed of a series of efforts which did not pass out of the experimental stage into fully developed invention until less than two years before November 1908. We see no occasion to reach any other result on that subject.

The Gerson & Sachse patent (German) has been mentioned. It produced only "a very thick mucilaginous liquid." It contemplated 20 parts of water to one of starch base. It was "very suitable for purposes of dressing," i. e., fabric sizing. Its use as a wood glue was not contemplated, nor was it possible except by departing from the suggestions of the patent. "Apparetine" (Gerard, British and Belgian patent) used a raw potato or other starch. Gerard did not disclose that it must be of the medium range, but it may have been. He used more than five parts of water to one of starch. He made "a new composition for sizing fabrics." Though he said that his article was "of considerable adhesive power only to be compared to that of (animal) glue", it would be worthless for general wood joining use. It very possibly did have among the threads of the fabric an adhesiveness comparable to that of some low grade or thin animal glue which alone could have been used for sizing purposes. More probably, his laudatory statement was as unintelligent as it was vague. His specification shows he was aiming directly away from Perkins' target. His product, known 25 years before Perkins', was never used as a wood glue. Defendant's expert, in (supposedly) reproducing the patent for the purposes of this case, used only 2½ parts of water (Perkins' claim of "less than three") instead of five, and frankly says that "the veneering industry would not tolerate as much water" as Gerard used.

Higgins (U. S. patent of 1897) made a "starch paste" (the familiar "library paste") "a soft or firm paste". He degenerated his starch and dissolved the cellulose (as far as he went) in one continuous process. A hasty reading of his patent indicates that he came much nearer to Perkins than any of the others did; yet the most that can be said [fol. 609–10] is that he almost anticipates, not quite. His preferred formula carries the degeneration nearly to the dextrinizing point, and produces a good paste for uniting papers. He thought,—and said,—that by varying his formula he could make an adhesive of any strength up to that of animal glue; but he was mistaken. The record indicates that, if Higgins used the Perkins proportion of starch and water (as he said he might), he should, in order to get a successful wood glue, have used much less heat than he specified or should otherwise have arrested degeneration (the action of the acid) at an earlier point; and that he did not know. True, he speaks of arresting the digestion (by which he means the action of the acid) at the "glutinous stage", when the adhesiveness is greatest; but he spoke vaguely; and when he thus "arrested the digestion" he did not conceive a further dissolution and "coming across"; he ran it at once into jars for storage. Perkins degenerated his starch with acid (or, by assumption, selected a starch of the same viscosity quality), and dissolved it, and particularly the cellulose, with alkali. Higgins used only acid for his degeneration and for his further mixing step, both of which he includes in the name "digestion"; he used his alkali only to neutralize the acid and stop the "digestion"; it would seem likely enough that his cellulose would be imperfectly dissolved and his product not be a successful glue.[2] Whatever the scientific reason, the fact is clear that the Higgins patent never was accepted as teaching the art how to make a wood glue; somewhere and somehow it fell short. Defendant's expert conducted a series of experiments making veneer glue joints with glues which he made

[2] Dr. Grosvenor says the partly dissolved portions of starch grains under the microscope look like broken stone or cement, "and the resulting adhesive can not be strong enough for a wood joint." * * * "The theoretical considerations" by which Higgins "pointed the way are perhaps correct theory, but the * * * practical possibilities were not conceived, and are far from the facts actually realized by carrying out Higgins' process. * * * Higgins says a number of enthusiastic things, but the facts are it (his paste) is an entirely different product, not useful for woodwork."

after various old patents (with variations which he thought permissible); he did not even try to use anything made according to Higgins. Plaintiff's expert tried every variation suggested by Higgins, and could get nothing better, in adhesiveness, than 500 or 600 pounds to the square inch,—[fol. 609–11] quite insufficient for the furniture and veneering art,—as we have recited re Gerson and Sachse. In short, Higgins does not respond to even the broad identification of claim 30, because his product is not, according to the lexicon of the specification, a "wood and fiber glue".

As to all the other alleged anticipations, it may be said that either from lack of efficient base, or from too much water, or too much degeneration, or lack of complete cellulose dissolution, or some similar reason, each one was practically useless as a wood and fiber glue, failed of doing any good to the wood-joining art, and to be effective needs modification along Perkins' lines. We have in the end a rather typical instance of the difference between success and failure. The situation, as we see it, is well stated in a quotation found in plaintiff's brief. "This new product is susceptible of identification irrespective of any reference to the process. If it has all the characteristics and capacities of the animal glue of the prior art, without containing any animal substance, and is novel, useful, and a result of the inventive faculties, it is patentable."

There remains the subject of the effect of the former litigation and of the disclaimer resulting therefrom. This litigation presents to our mind the most serious obstacle to plaintiff's case. It appears that one Kane, knowing of the success of the Perkins glue, became interested in its commercial aspect, and, associated with former employees of Perkins, familiar with the situation, he put upon the market, as a glue base to be used by manufacturers for making the glue in their factories, a starch which has been called the "Solva base." He and others organized the Solva Company for this purpose. Perkins brought an infringement suit in the Northern District of Illinois, claiming infringement, either direct or contributory, of claims out of each of the five groups. It appears that—to accept the defendant's argument—"the major portion" of defendant's output was raw cassava starch, just as is now the case (the present Kane base is used by the present defendant); that

some portions of their output had been degenerated either by a mixture with low grades of raw starch on the market, or by a preliminary treatment like Perkins' first step. The [fol. 609–12] case came on for final hearing before Judge A. L. Sanborn. (223 Fed. 792.) He sustained the patent and found infringement of one claim out of each of the five groups. He based his conclusion upon his adoption of the same general view of the facts and the law to which we have in the foregoing pages given our approval, as far as they relate to that part of the subject-matter which has continued to be and is here in controversy. His opinion indicated that the glue made from that Solva base which was only the raw starch, was within the valid claims of the patent. In the decree, no distinction was made as to the different kinds of Solva base involved in the case. Upon appeal by the defendant, the Seventh Circuit Court of Appeals rendered an elaborate opinion. (251 Fed. 64.) It is not too much to say, as Judge Sanborn did after the remand, that it was in some respects obscure; indeed, the uncertainties which have developed in trying to apply it in other cases have led to much difference of opinion. We can not attempt an elaborate analysis. It held that the claims to the first step of the process, and to the product resultant therefrom—the glue base—were anticipated by Gerson & Sachse, and hence that the glue base, as a product and as the foundation of the second step in Perkins' process, was an old and unpatentable product. It found that Perkins' glue had the novelty and merit claimed for it. It sustained the claims to the compound two-step process, and, to some extent at least, the claims to the ultimate product, and did not sustain the claims to the second-step process. No attention was paid to any distinctions in the different kinds of Solva base that were involved. Its treatment of the process claims to the second-step process is open to the interpretation—and we think it the right one—that the Court considered those claims broad enough to cover the specified treatment as applied to any starch base however high in viscosity, and employing water to any extent, and even though the product would not approximate Perkins glue; and hence thought them invalid. If that view is correct they were too broad. At the conclusion of its opinion the Court said that the decree below "sustaining the claims for

the glue base and product, and for the so-called second-step [fol. 609–13] as such, is reversed, and that part of it which upholds the claims of the patent for the final process and the resultant product is affirmed."

The only claim which has been sustained below—the "resultant product"—was the claim to the final glue, without reference to the processes involved; and it seems to us fairly clear that the Court used this phrase to refer to the resultant product of the second-step, meaning thereby the ultimate product claims, as distinguished from the intermediate product which was the "resultant product" of the first step, and was found to be old.

We do not find in the detailed discussion in the opinion any considerations which would compel, nor do we know of principles which would permit, a holding that the final product claims, as they read, extend only to glue which had been made by the employment of both steps of the compound process; and we think we should not attribute to the Court any intention to declare that limitation.

Upon rehearing application in that case the Court was by defendant urged to clarify its opinion so as to show that there would be no infringement unless both steps of the process were used. The petition for rehearing was denied without comment. The opinion came up for interpretation when Judge Sanborn settled the final decree upon the mandate. He decided that the claims for the ultimate product were infringed, again making no distinction between the different varieties of the Solva base. He held that the claims for the second process step were not valid, but, as they read, were the claims "for a second step as such", to which the Court of Appeals had referred as invalid. From this decree neither side appealed again, although Judge Sanborn suggested that a second appeal was rather necessary for interpretation.

Several references have been made to the fact that plaintiff did not appeal from the decision holding invalid the second-step process claims as they read, and for lack of such appeal inferences are drawn against the plaintiff as to the validity or scope of the final product claims. This is again a non-sequitur; but we see no basis for such inferences. The plaintiff had an infringement decree upon the product [fol. 609–14] claims. Its injunction could have been no

broader, nor its recovery of damages greater, if the process claims were also sustained. The decree sufficiently bound the defendant, and it would not bind strangers anyhow, no matter what form it took. Whether plaintiff should appeal as to these process claims was merely a matter of policy,—and of doubtful policy. As to the product claims, it could not appeal, because the decree was in its favor. It acquired no right of appeal because Judge Sanborn used some reasoning which might be applied to limit those claims in some later litigation with others.

As a result of this decree, plaintiff filed a disclaimer of all the claims for the glue base itself, and all those for the first process step. It further disclaimed from the second process step "any process of making glue excepting where this staerh or starchy product, or carbohydrate subjected to the process, is degenerated to the extent described [in the patent], whereby the process results in the good as animal glue described" in said patent. The fair intent of this disclaimer as to the second step claims was, we should think, to limit them to a process where the material with which the process step begins is the less than high viscosity indicated by the teachings of the patent to be necessary to produce the result at which the second process step was aimed. Such material might aptly have been called "degenerate." We see no fatal magic in the use of the participle instead of the adjective. Certainly—as we think—in view of the fact that it was now being conceded that there was no novelty in the first step of its product, this disclaimer can not be intended to confine the affected claims to a process based upon this abandoned first step product; this would be to build up patentable novelty upon a concession of no novelty. The reference was not to the base which had been degenerated in the manner specified in the patent,[3] but to one degenerated (or degenerate) to the extent so specified; and this must be interpreted in connection with the statement remaining in the specification, that the second step could be practiced, and the ultimate product obtained, by commencing the second step with raw, un-[fol. 609-15] treated cassava starch. Whether or not plaintiff was at the early date correct in this statement, it nevertheless demonstrates his theory of this patent; but, what-

[3] As was by error said in one of the later decisions.

ever the proper construction of this disclaimer, in our judgment it can not in law have the effect of destroying the distinction between the process and product claims, and make the latter invalid so far as they do not imply the former. The absence of any effect upon product claims resulting from a disclaimer which narrows method claims in the same patent clearly follows from their mutual independence; there is no reason why there should be any such effect. The inventor of a new product need not take any process patent at all; the fact that he asks and is content with a modest method claim can not make his product patent worse than if he were content to ask for no method protection whatever. The effect upon product patent of a process-claim narrowness which comes from original issue and that which is achieved by disclaimer must be identical. A patentably new article does not necessarily involve any patentable process; merely putting ingredients together is not such a process. If it turns out that the process claim, as issued, omits some step which may or may not be essential but which the patentee is willing to accept as a limitation, such acceptance by disclaimer seemingly can not modify the separate grant of monopoly on the thing made. Goodyear's vulcanized rubber was a new thing, patentable as such. If his accompanying method patent had been found to be so broad that it might cover old methods, its correction by reissue or disclaimer could hardly have limited the product patent,—the whole purpose of which was to get protection independent, as far as possible, of method limitation. For further comment on inter-relation of method and product, see our opinion in Bishop v. Fulton, filed March 7, 1927; to the effect that a disclaimer does not concede former invalidity, see Permutit Co. v. Wadhams—C. C. A. 6—13 Fed. (2) 454, 457; and that a specific disclaimer as to some claims does not affect the remaining claims, see Graham v. Earl—C. C. A. 9—92 Fed. 155, 158; United States Co. v. Hewitt Co.—C. C. A. 7—236 Fed. 739, 742; Robinson on Patents, Vol. 2, Section 650.

[fol. 609-16] Subsequent cases came on for hearing in Western Michigan by Judge Sessions, and in Northern New York before Judge Cooper. These cases were based upon the product claims now in suit, and were directed against the same Kane base made of raw cassava starch now in-

volved. The opinions of these judges are found in 279 Fed. 454, 457, and 458, and are in accordance with the views we have expressed, both as to the original merits, the interpretation of the Solva decision and the disclaimer. The next case was heard by Judge Geiger, in the Eastern District of Wisconsin. 280 Fed. 728. He took the view that the Court of Appeals in the Solva case intended to confine the claims for the ultimate product to one which had been produced by practicing both steps of the process successively, and, influenced apparently also by the thought that there could be no invention in using more or less water in some of the old processes which produced mucilage or paste, held that these product claims did not reach the use of the Kane base involved. A little later Judge Cooper's opinion was reviewed by the Second Circuit Court of Appeals. (287 Fed. 109.) That Court adopted generally the same view expressed by Judge Geiger, and reached the same result. Still later Judge Geiger's opinion was affirmed by the Seventh Circuit Court of Appeals (292 Fed. 596), although it should be noted that the personnel of that Court had entirely changed since the Solva decision, so that its interpretation of that decision was based only on the record. Thereupon Judge Sessions, in deference to these last two decisions, reconsidered his first decision in the present case, and as to the Kane base dismissed the bill.

With the greatest deference to the opinions of the Circuit Courts of Appeals of the Second and Seventh Circuits, we find ourselves unable to concur with them. Even if we could agree that their interpretation of the intent of the Court in the original Solva opinion was right, we would still think that we ought not to reach the same result as they do, because in that event we would feel constrained not to follow the Solva decision.

The decree below is reversed, and the cause remanded for further proceedings in accordance with this opinion.

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[fol. 609-17] In United States Circuit Court of Appeals

Motion to Stay Mandate—Filed May 2, 1927

On the proceedings heretofore had herein and on the Petition for leave to file a Bill of Review filed concurrently

with this Motion, defendant-appellee, Holland Furniture Company, by its counsel, moves this Honorable Court for a stay of mandate pending the determination of the Petition for leave to file a Bill of Review.

Holland Furniture Company, by William H. Davis, Counsel.

Dated April 29, 1927.

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IN UNITED STATES CIRCUIT COURT OF APPEALS

PETITION FOR LEAVE TO FILE BILL OF REVIEW—Filed May 2, 1927

Holland Furniture Company, the defendant herein, and Kane Manufacturing Company, a corporation of Illinois, having a regular and established place of business in Chicago, County of Cook, State of Illinois, bring this their petition for leave to file a Bill of Review, and respectfully show unto this Court:

First. That, as appears from the records before this Court in this case, after trial and hearing and due proceedings had, a final decree was entered on August 5, 1921, holding Reissue Letters Patent No. 13,436 valid and infringed by your petitioner, Holland Furniture Company, and dismissing the bill of complaint as to the individual defendants, J. A. Vanderveen, Jacob Vanderveen, Dirk Vanderveen and Everett P. Stephan, and ordering an accounting of profits and damages by your petitioner, Holland Furniture Company.

Thereafter and prior to the entry of the final decree, namely on July 26, 1923, the case was reopened on defendant's petition for rehearing and on motion to reopen for the purpose of introducing certain prior art patents [fol. 609-18] and publications and translations thereof. New evidence was thereupon submitted, and a final decree was entered on March 17, 1924, holding that your petitioner, Holland Furniture Company, had not infringed upon the exclusive rights of the plaintiff under Reissue Letters Patent No. 13,436, by employing processes and making and using products wherein the starch base used was

furnished by your petitioner, Kane Manufacturing Company, and known as the "Kane base."

An appeal having been allowed from said decree on September 9, 1924, and due proceedings having been had, this Court handed down its opinion reversing said District Court, which opinion was filed on April 2, 1927.

Second. Your petitioners further represent that your petitioner, Kane Manufacturing Company, sold to your petitioner, Holland Furniture Company, the starch base known as the "Kane base" in this litigation, and guaranteed and agreed to defend any action brought against your petitioner, Holland Furniture Company, for infringement of the said Perkins Reissue Letters Patent No. 13,436, by reason of the Holland Furniture Company's use of the said Kane base, and agreed to hold the Holland Furniture Company harmless. Upon the filing of the bill of complaint in this case, your petitioner, Holland Furniture Company, called upon your petitioner, Kane Manufacturing Company, to defend the suit and to make good its agreement to hold the Holland Furniture Company harmless. Thereupon your petitioner, Kane Manufacturing Company, actively and openly defended this suit brought against your petitioner, Holland Furniture Company, appearing in said suit by its engineers, experts, attorneys and officers, and conducting the entire defense and your petitioner, Holland Furniture Company, took no part in the defense of the action, had no control over, and did not appear in said suit.

Subsequent to the bringing of this suit, namely on June 14, 1921, the Perkins Glue Company filed a complaint against the Gould Manufacturing Company et al., and a complaint against the Wisconsin Chair Company et al., in the United States District Court for the Eastern District of Wisconsin, charging said defendants with infringement of Reissue Letters Patent No. 13,436, and praying for an [fol. 609-19] award of profits and damages arising out of said alleged infringement and that said defendants be enjoined against further infringement.

That the infringement thereby complained of was the use by the defendants of Kane base supplied by the Kane Manufacturing Company.

That answers having been filed, and said actions were tried as one, and evidence having been presented by both

sides and the cause having been argued by counsel before Hon. F. A. Geiger, United States District Judge for the Eastern District of Wisconsin, and due consideration having been had, final decrees were entered in those cases on May 16, 1922, dismissing said bills of complaint for want of equity.

Following said decrees, namely on November 6, 1922, appeals were allowed in said cases by said District Court to the United States Circuit Court of Appeals for the Seventh Circuit and in due time said causes came on to be heard and after argument by counsel, said Court entered a decree affirming the District Court for the Eastern District of Wisconsin on June 18, 1923.

That on July 16, 1923, a petition for rehearing was filed in said actions by the plaintiff, and on October 1, 1923, said petition for rehearing was overruled.

That a petition to the Supreme Court of the United States for a Writ of Certiorari to review the decision of the Circuit Court of Appeals for the Seventh Circuit was denied on January 7, 1924.

That thereafter, namely on March 15, 1924, a mandate from said Circuit Court of Appeals for the Seventh Circuit to the United States District Court for the Eastern District of Wisconsin was filed in said District Court.

That the Kane Manufacturing Company actively and openly defended said action against the Gould Manufacturing Company and said action against the Wisconsin Chair Company. That said Kane Manufacturing Company appeared in said actions by its engineers, experts, attorneys and officers and conducted the entire defense. That the nominal defendants in those actions, namely the Gould Manufacturing Company and the Wisconsin Chair Company, took no part in the defense of the actions, had no control over, and did not appear in said actions. That the [fol. 609-20] Kane Manufacturing Company was under agreement to defend said actions and hold said defendants harmless.

That the respondent, Perkins Glue Company, the plaintiff in those actions, knows and at the time of the several said actions against the Holland Furniture Company, Gould Manufacturing Company and Wisconsin Chair Company, knew that the real party in interest as defendant was the

Kane Manufacturing Company, and not the nominal defendant.

Third. That, as it appears from the records before this Court, the Kane base supplied to your petitioner, Holland Furniture Company, by your petitioner, Kane Manufacturing Company, the use of which was alleged in this action to be infringement of the patent in suit, was the same as the Kane base supplied by the Kane Manufacturing Company to the defendants, Gould Manufacturing Company and Wisconsin Chair Company, in the two actions hereinafter referred to.

Fourth. And your petitioners further aver that at the time of presentation of the petition for rehearing and motion to reopen herein, viz. on July 26, 1923, the decision of the Court of Appeals for the Seventh Circuit in the Gould Manufacturing Company and Wisconsin Chair Company cases, dated June 18, 1923, was brought to the attention of the District Judge in this suit, whereupon the District Judge granted the motion to reopen, and lifted the injunction against your petitioner, Holland Furniture Company, so far as the Kane base was concerned, and expressed his intention to so modify the earlier decision in this case as to exclude therefrom the Kane base, and glue made therefrom. Thereafter by stipulation there was introduced into this case certain prior art patents and publications, and translations thereof, and expert testimony in regard thereto, and subsequently the form of the final decree to be entered herein was agreed upon between counsel and submitted to the District Court, and the said final decree was entered on March 17, 1924.

Fifth. That evidence of the final decrees in the cases in the Seventh Circuit has not been offered in this case, and [fol. 609-21] evidence of the substantial and material facts recited in paragraph Second herein have not been offered in this case.

And your petitioners further represent that the reason why the decree of the District Court for the Eastern District of Wisconsin, dated May 16, 1922, was not offered in evidence in this case was that the interlocutory decree in this case was entered prior to the decree in said case in

the Eastern District of Wisconsin and that an appeal was taken from said decree in the Eastern District of Wisconsin to the Circuit Court of Appeals for the Seventh Circuit; that after the decision of the Circuit Court of Appeals for the Second Circuit, and while the petition for rehearing was still pending in said Court, proceedings were taken before the District Court in this case, as recited in paragraph Fourth above, resulting in a final decree in defendant's favor; that immediately after the mandate of the Circuit Court of Appeals for the Seventh Circuit was filed in the District Court for the Eastern District of Wisconsin, namely on March 17, 1924, the final decree was entered in this case denying the plaintiff recovery by reason of the use of Kane base furnished by your petitioner, Kane Manufacturing Company, without evidence of the final decree in the case in the Eastern District of Wisconsin; that thereafter there was no necessity for presenting the foregoing facts in this case until after the reversal by this Honorable Court of the said final decree of the District Court.

Seventh. And your petitioners are further informed and believe and therefore aver that the final decree in the cases brought by the Perkins Glue Company against the Wisconsin Chair Company and the Gould Manufacturing Company have finally established, as against the Perkins Glue Company and in favor of the Kane Manufacturing Company, the right of the Kane Manufacturing Company to sell the said Kane base to its customers, and to instruct its customers how to use that base for the manufacture of glue, and that the said decree estops the Perkins Glue Company to interfere in any way with the use of the Kane base by customers of the Kane Manufacturing Company, and that such a decree makes the question of infringement of Reissue Letters [fol. 609-22] Patent No. 13,436 by the use of the Kane base sold by and purchased from the said Kane Manufacturing Company res judicata, so that it is the duty of the Perkins Glue Company to refrain from any and all interference with the customers of the Kane Manufacturing Company with respect to the use of the said Kane base, and that if these facts are introduced in evidence before the United States District Court for the Western District of Michigan, Southern Division, it would result in a decree holding

that there is no libility to the Perkins Glue Company for the use of Kane base purchased from the Kane Manufacturing Company.

And your petitioners therefore pray:

1. That an order may be granted by this Honorable Court requiring respondent, Perkins Glue Company, to show cause why the relief herein prayed for by your petitioners should not be granted;

2. For leave to apply for leave to file a bill of review in the United States District Court for the Western District of Michigan, Southern Division, against the Perkins Glue Company, setting up the aforesaid evidence in order that justice may be done in the premises;

3. That the mandate of this Court provide that, pending the determination of said bill of review, the alleged infringement based upon the use of Kane base purchased from the Kane Manufacturing Company be exempted from the operation of said mandate;

4. That the issuance of the mandate herein may be stayed pending the determination of this petition;

5. And for such other and further relief as to this Court may seem just and equitable in the premises.

Holland Furniture Company, Kane Manufacturing Company, Petitioners, by William H. Davis, Counsel.

[fol. 609-23] *Duly sworn to by T. B. Kane. Jurat omitted in printing.*

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[fol. 609-24-26] IN UNITED STATES CIRCUIT COURT OF APPEALS

ORDER TO SHOW CAUSE AND STAY MANDATE—Filed May 9, 1927

On the proceedings had herein and on the Petition for leave to file a Bill of Review filed herein by the Holland Furniture Company and the Kane Manufacturing Company, copy of which Petition is annexed hereto, you, Perkins Glue Company, are hereby

Ordered to show cause, if any there be, at a session of this Court to be held at the Federal Building, Cincinnati, Ohio, on June 7, at 10:30 in the forenoon, or as soon thereafter as counsel may be heard, why the relief prayed for in said Petition should not be granted.

It is further ordered that any matter to be relied on in opposition to said Petition be filed and served on counsel for petitioners prior to June 1.

It is further ordered that this Order be served on counsel for the Perkins Glue Company on or before May 15.

It is further ordered that the Mandate in this cause be stayed pending the determination of the Petition.

Clerk's certificate to foregoing omitted in printing.

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[fol. 609-27] In United States District Court, Western District of Michigan, Southern Division

In Equity. No. 1898

Perkins Glue Company, Plaintiff,

v.

Fred E. Hood, George A. Wright, and John R. Beckwith, Doing Business under the Firm Name of Hood & Wright, Defendants

In Equity. No. 1899

Perkins Glue Company, Plaintiff,

v.

West Michigan Furniture Co. and George P. Hummer, Defendants

Evidence introduced herein from the Case of Perkins Glue Company vs. Solva Waterproof Glue Company et al., tried in the United States District Court for the Northern District of Illinois, Eastern Division

[fol. 610] UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION

In Equity. No. 127

PERKINS GLUE COMPANY, Complainant,

vs.

SOLVA WATERPROOF GLUE CO. et al., Defendants

INTERROGATORIES TO PLAINTIFF AND ANSWERS THEREOF BY J. B. B. STRYKER ON BEHALF OF PLAINTIFF, MAY 2, 1914

(1) How long have you held the office of vice-president of the complainant corporation?

Ans. Since January, 1911. The company was incorporated about November, 1910.

(2) What connection, if any, did you have with the complainant corporation prior to becoming vice-president thereof?

Ans. None. See answer to interrogatory No. 1.

(3) What has been the business of the complainant corporation during the time you have been an officer of or connected with it?

Ans. Making and selling vegetable glue.

(4) Have you actively participated in the management and carrying on of the business of the complainant corporation since you have been an officer of or connected with it?

Ans. Yes.

(5) Have you been familiar with the business of the complainant corporation since you have been an officer of or connected with it?

Ans. Yes, in a general way.

(6) What connection, if any, did you have, and what official position, if any, did you hold in the corporation Planters Manufacturing Company, which is named in the bill of complaint in this cause as the predecessor in business of the complainant corporation, Perkins Glue Company?

Ans. Was secretary and treasurer; from 1903 was also manager of factory; before 1903, in a subsidiary position.

[fol. 611] (7) Between what dates and during what period were you connected with the Planters Manufacturing Company in the manner stated in your answer to the immediately preceding interrogatory?

Ans. Was secretary and treasurer from about 1905 till the Perkins Glue Company was formed, and manager of the factory from about 1903 until Perkins Glue Company was formed.

(8) What was the business of the Planters Manufacturing Company during the period of your connection with it, and at what place of business located during said period?

Ans. Manufacturing and selling products from the cassava plant at Lake Mary, Florida; West Newton, Massachusetts; New York City, New York; and South Bend, Indiana.

(9) Did you actively participate in the management and carrying on of the business of the Planters Manufacturing Company during the period of your connection with it, and were you familiar with its business during said period?

Ans. I actively participated in the management of the factory from the time I became manager of it, and from that time I was generally familiar with the business of the Planters Manufacturing Company. Also before 1903 I was somewhat familiar with the business.

(10) Were you acquainted, during his lifetime, with Frank G. Perkins, the patentee of the letters patent in suit in this cause?

Ans. Yes.

(11) When did Mr. Perkins die, and for how long a period, prior to his death, had you been acquainted with him?

Ans. He died September, 1910. I was acquainted with him for about eighteen years prior to his death.

(12) What connection, if any, did Mr. Perkins have with the complainant corporation, and with its predecessor in business, Planters Manufacturing Company, during his lifetime?

Ans. Mr. Perkins was president of the Planters Manufacturing Company, and later conducted the business as agent. Mr. Perkins died before the incorporation of the Perkins Glue Company was completed.

(13) When, if ever, did Mr. Perkins first disclose to you the inventions covered by the letters patent in suit in this cause, or either of them?

Ans. As the question is not confined to any particular formula, and as I do not know what various formulas and [fol. 612] products the court will construe as coming within the claims, of the patents in suit or the inventions thereof, I cannot answer the question.

(14) If said inventions were disclosed to you by Mr. Perkins at different dates, which invention was first disclosed to you, and when was the other one disclosed to you?

Ans. For the reasons given in the answer to interrogatory No. 13, I cannot answer.

(15) When and where, if at any time and place, and by whom, did you first see the inventions covered by the letters patent in suit in this cause, or either of them, demonstrated or put into practice?

Ans. For the reasons given in the answer to interrogatory No. 13, I cannot answer.

(16) Which of said inventions did you first see so demonstrated and put in practice, and when, where and by whom, did you first see the other of said inventions demonstrated and put into practice?

Ans. For the reasons given in the answer to interrogatory No. 13, I cannot answer.

(17) How frequently, and when, where and by whom, did you see said inventions, and each of them, put into practice subsequently to the dates given in your answers to the two immediately preceding interrogatories?

Ans. For the reasons given in the answer to interrogatory No. 13, I cannot answer.

(18) What are the names and present places of residence, so far as known to you, of each and all of the persons who were familiar with, or had any opportunity to become familiar with, the inventions covered by the two letters patent in suit in this cause at the dates and during the periods covered by your answers to the three immediately preceding interrogatories?

Ans. For the reasons given in the answer to interrogatory No. 13, I cannot answer.

(19) What was your connection, officially or otherwise, with the Planters Manufacturing Company during the year 1905?

Ans. Manager of the factory at Lake Mary, Florida.

(20) Did you actively participate in the management and carrying on of the business of the Planters Manufacturing Company, and were you familiar with its business, during the year 1905?

Ans. I actively participated in the management or running of the factory, and to that extent in the carrying on of the business, and was familiar in a general way with the [fol. 613] business of the Planters Manufacturing Company.

(21) What were the products of the Planters Manufacturing Company during the year 1905?

Ans. Starch, sizing for cotton goods, sizing for carpet cops, paper box adhesives, gloy for sizing or weighting cordage and yarns, and vegetable glue.

(22) What was the product or material shipped by the Planters Manufacturing Company during the year 1905 to Lowell M. Palmer, at Poplar Bluff, Missouri, and invoiced as "Perkins' Veneer Glue"?

Ans. This was a series of many different bases made from cassava, for making vegetable glue. During 1905, 1906 and 1907 Mr. Perkins was making so many changes in his formulas for making the bases and in his formulas for dissolving the bases to form glue, and shipping so many different products in an endeavor to perfect the glue, that I cannot answer the question more definitely.

(23) What was the product or material shipped by the Planters Manufacturing Company during the year 1905 to Lowell M. Palmer, at Poplar Bluff, Missouri, in bags marked "L"?

Ans. I think this was a number of different bases made from cassava for making vegetable glue, which had a lower viscosity than the bases marked "H." For the reasons given in the last answer, I cannot answer more definitely.

(24) What was the product or material shipped by the Planters Manufacturing Company during the year 1905 to Lowell M. Palmer at Poplar Bluffs, Missouri, in bags marked "H"?

Ans. I think this was a number of different bases made from cassava for making vegetable glue, which had a higher viscosity than the bases marked "L." For the reasons given in answer to interrogatory No. 22, I cannot answer more definitely.

(25) To what treatment, if any, were said products or materials referred to in interrogatories 21 to 24, inclusive, subjected to in the plant of the Planters Manufacturing Company?

Ans. Since no particular product or products are specified in the interrogatory, and since many of the treatments or processes used were secret processes and are still maintained secret, and since Mr. Perkins was making many changes in his formulas and using many different formulas for making the products in question, in an endeavor to perfect the same, I cannot answer.

[fol. 614] (26) Were any of the products or materials referred to in interrogatories Nos. 21 to 24, inclusive, subjected to a process of treatment in the plant of the Planters Manufacturing Company consisting in agitating a starchy carbohydrate with a digesting agent to decrease its water absorptive properties?

Ans. Sometimes they were, and sometimes they were not.

(27) Was the carbohydrate referred to in the immediately preceding question obtained from Cassava?

Ans. Some of them were obtained from cassava. I am not certain as to all.

(28) Did said process of treatment referred to in interrogatory No. 25 render the carbohydrate soluble in cold water?

Ans. Yes, to a certain extent, that is, in some, at least, of the various treatment- I found that more or less of the carbohydrate was rendered soluble in cold water, in some treatments more than in others.

(29) Did the digesting agent referred to in interrogatory No. 26 have an acid reaction?

Ans. In some of the various processes the digesting agent had an acid reaction.

(30) Did the process referred to in interrogatory No. 25 consist in agitating cassava carbohydrate with water and a starch converting agent, whereby the polymerization of the carbohydrate was altered to a point such that when dissolved it would form a viscous semi-fluid unjellified product adapted to be applied by machinery?

Ans. Since I do not understand enough chemistry to clearly understand the meaning of polymerization in the question, and because of the reasons mentioned in answer to interrogatory No. 25, I am unable to answer.

(31) Did the process referred to in interrogatory No. 25 consist in taking suitable carbohydrate material and properly proportioning the viscosity, cohesiveness and adhesiveness of the carbohydrate material, resulting when it is dissolved to form glue applicable by machinery?

Ans. For the reasons given in answer to interrogatory No. 25, I cannot answer.

(32) Did the process referred to in interrogatory No. 25 consist in agitating a starchy carbohydrate with water and suitable chemicals below the bursting temperature of the starch to proportion the viscosity, adhesiveness and cohesiveness, resulting when the base is dissolved to form glue applicable by machinery?

[fol. 615] Ans. For the reasons given in answer to interrogatory No. 25, I cannot answer.

(33) Did the process referred to in interrogatory No. 26 consist in treating cassava flour with substantially an equal weight of water, heating the same to about 130° Fahrenheit and adding about 2 per cent or 3 per cent by weight of strong acid slowly and with agitation, without rendering the flour material soluble in water, then neutralizing the acid with an alkali after from four to six hours' agitation?

Ans. As far as I know, none of the processes carried out in 1905 would meet the specifications of the interrogatory.

(34) Where the materials or products, referred to in interrogatories Nos. 21 to 24, inclusive, or any of them, characterized by the fact that they were prepared from starchy material and retained substantially unchanged in size and general form of particle when treated with cold water and produced opalescent, cloudy solutions with water at 200° Fahrenheit?

Ans. I do not know.

(35) Were the materials or products referred to in interrogatories Nos. 21 to 24, inclusive, or any of them, composed of suitable carbohydrate, which, when mixed with about three parts or less by weight of water and a solvent of cellulose would form a semi-fluid mass having substantially the adhesive properties of animal glue?

Ans. I believe none of the processes carried out in 1905 would meet the specification of the interrogatory.

(36) Did the materials or products referred to in interrogatories Nos. 21 to 24, inclusive, or any of them, consist

in a base for making glue as distinguished from mucilages, sizes and pastes embracing treated amylaceous grains substantially insoluble in water and an outer so-called amylocellulose coating, of which, in soluble grains, was partially, but not entirely, converted?

Ans. I do not understand the question, and consequently can give no answer.

(37) Did the process referred to in interrogatory 25, consist in agitating cassava carbohydrate with water, sodium peroxid, and caustic soda, whereby the polymerization of the carbohydrate is altered?

Ans. For the reasons given in answer to interrogatory No. 30, I am not at present able to answer.

(38) Did the process referred to in interrogatory 25, consist in treating a starchy carbohydrate or its equivalent, with water and an alkaline digesting agent until the water absorptive properties of the carbohydrate are decreased [fol. 616] and the viscosity, adhesiveness and cohesiveness resulting when the material is dissolved to form glue are properly proportioned for application of the glue by machinery?

Ans. For the reasons given in answer to interrogatory No. 25, I am not able to answer.

(39) Did the process referred to in interrogatory 25, consist in treating cassava starch with water, then adding peroxid of soda in the form of a solution, and also simultaneously treating it with a solution of caustic and agitating the same?

Ans. For the reasons given in answer to interrogatory No. 25, I am not able to answer.

(40) Did the process referred to in interrogatory 25 consist in treating cassava carbohydrate with water containing from ¼ per cent to 1 per cent by weight of peroxid of soda in the form of a solution of substantially twenty parts by weight of water to one part of peroxid of soda and also treating it with from ¼ per cent to ½ per cent of a caustic alkali in the form of a solution of substantially ten parts of water to one part of alkali by weight?

Ans. For the reasons given in answer to interrogatory No. 25, I am at present not able to answer.

(41) Did the process referred to in interrogatory 25 consist in treating a suitable carbohydrate with an alkali oxid-

izing material to properly proportion the viscosity, adhesiveness and cohesiveness, resulting when the carbohydrate is dissolved to form a glue?

Ans. For the reasons given in answer to interrogatory No. 25, I am at present unable to answer.

(42) What business association or connection, if any, did you have with Frank G. Perkins during the years 1906, 1907, 1908, 1909 and 1910?

Ans. I was manager of the Planters Manufacturing Company plant at Lake Mary, Florida, the business of which was being conducted by Mr. Perkins.

(43) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1907, and invoiced as "Veneer Glue"?

Ans. This was a vegetable glue base, made from cassava.

(44) How did it differ, if at all, from the product referred to in interrogatory No. 22?

Ans. Different raw materials were used, and different processes were used in preparing it, and the lat-er material was better when mixed, in that it was less lardy and short [fol. 617] and had better adhesion, and would work up into a smoother, better flowing glue, and would spread better.

(45) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1907, and invoiced as "Light Body Veneer Glue"?

Ans. This was a vegetable glue base, made from cassava.

(46) How did the material or product referred to in the last interrogatory differ from that referred to interrogatory No. 23?

Ans. Different raw materials were used, and different process were used in preparing it, and the lat-er material was better when mixed, in that it was less lardy and short, and had better adhesion, and would work up into a smoother, better flowing glue, and would spread better.

(47) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to R. M. Parker, Agent, at Poplar Bluff, Missouri during the year 1907, and invoiced at "Glue"?

Ans. This was a vegetable glue base, made from cassava.

(48) How did the product or material referred to in the last interrogatory differ from the product or material referred to in interrogatories Nos. 22, 23 and 24?

Ans. Different raw materials were used, and different processes were used in preparing it, and the lat-er material was better when mixed, in that it was less lardy and short, and had better adhesion, and would work up into a smoother, better flowing glue, and would spread better.

(49) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1908, and invoiced as "Glue"?

Ans. This was a vegetable glue base, made from cassava.

(50) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1908, and invoiced as "Veneer Glue L. B."?

Ans. This was a vegetable glue base, made from cassava.

(51) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins [fol. 618] to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1908, and invoiced as "Veneer Glue H. B."?

Ans. This was a vegetable glue base, made from cassava.

(52) How did the product or material referred to in interrogatory No. 50 differ from that referred to in interrogatory No. 23?

Ans. Different raw materials were used, and different processes were used in preparing it, and the lat-er material was better when mixed, in that it was less lardy and short, and had better adhesion, and would work up into a smoother, better flowing glue, and would spread better.

(53) How did the product or material referred to in interrogatory No. 51 differ from that referred to in interrogatory No. 24?

Ans. Different raw materials were used, and different processes were used in preparing it, and the latter material was better when mixed, in that it was less lardy and short, and had better adhesion, and would work up into a smoother, better flowing glue, and would spread better.

(54) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins to

R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1905, and invoiced as "Veneer Glue"?

Ans. Do not know of any shipment to R. M. Parker, Agent, in 1905.

(55) How did the product or material referred to in the last interrogatory differ from that referred to in interrogatories Nos. 22 and 43?

Ans. For the reasons given in the last answer, I cannot answer this interrogatory.

(56) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1908, and invoiced as "Light Body Glue"?

Ans. This was a vegetable glue base, made from cassava.

(57) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1908, and invoiced as "Heavy Body Glue"?

Ans. This was a vegetable glue base, made from cassava.

[fol. 619] (58) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1909, and invoiced as "Veneer Glue"?

Ans. This was a vegetable glue base, made from cassava.

(59) How did the product or material referred to in the last interrogatory differ from that referred to in interrogatories Nos. 22 and 43?

Ans. In respect of interrogatory No. 22, the differences, as far as I am now able to state them, were as given in my answer to interrogatory No. 44. In respect of interrogatory No. 43, different raw materials were used, and different processes were used in preparing it, but the differences as to shortness, adhesion, flowing and spreading qualities were not so great as between the glue shipped in 1905 and the glue shipped in 1907, as specified in answer to interrogatory No. 44.

(60) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1909, in bags marked "Light," and invoiced as "Glue"?

Ans. I do not know of any being shipped in bags marked "Light."

(61) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1909, in bags marked "Heavy" and invoiced as "Glue"?

Ans. I do not know of any being shipped in bags marked "Heavy."

(62) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1909, in bags marked "L," and invoiced as "Glue"?

Ans. This was a vegetable glue base, made from cassava.

(63) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1909, in bags marked "H," and invoiced as "Glue"?

Ans. This was a vegetable glue base, made from cassava.

(64) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to [fol. 620] R. M. Parker, Agent, at Poplar Bluff, Missouri, during the years 1910, in bags marked "L," and invoiced as "Glue"?

Ans. This was a vegetable glue base, made from cassava.

(65) What was the product or material shipped by the Planters Manufacturing Company, or by F. G. Perkins, to R. M. Parker, Agent, at Poplar Bluff, Missouri, during the year 1910, in bags marked "H," and invoiced as "Glue"?

Ans. This was a vegetable glue base, made from cassava.

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DEPOSITION OF FRANK BAKER, A WITNESS PRODUCED ON BEHALF OF DEFENDANTS, TAKEN MARCH 25, 1914

I am foreman of Brooklyn Cooperage Company, Poplar Bluff plant. Have been connected with them since 1899. I first met F. G. Perkins sometime in February 1905. He was brought into the mill by the superintendent, Mr. Nelson Windsor, and introduced as Mr. F. G. Perkins, who wanted to make some tests of his glue, to my recollection. We made

arrangements in the glue department for testing his glue, or mixing his glue. He went right ahead and made his test. It took him two or three days to make this test. At the time Mr. Perkins came we had nine double jacket steam kettles which were stationed upstairs and piped to the glue spreaders in the room below, which spreaders put the glue on the veneer sheets which were used for making veneer heading. Casein glue was being used at the time Mr. Perkins came, for the purpose of gluing together veneers for making barrel headings. We rigged up one of the nine steam jacket kettles which we had been using for mixing casein, for Mr. Perkins to do his mixing in. I furnished him a carpenter to help put in an agitater or wooden paddle to stir his glue and connect it up to the line shaft of the belt, and when he got that done Mr. Perkins started in to make his test. I could not say how he prepared his materials; I do not know. He made quite a few tests without my knowledge; that is, I will say quite a few mixtures without my knowledge. He would mix a batch till it would not flow through the pipe, and would dip it out of the small pot, carry it downstairs and pour it into the glue spreader pot, and he continued to do that to relieve that mixture, and then we continued to use the casein on the two spreaders and make this test on one, and as soon as we would get through with this test we [fol. 621] would continue to use casein until we got a new batch—probably next day. The glue spreader used for spreading the casein and which Mr. Perkins used to spread his glue consisted of two rollers, one above the other, about twelve inches in diameter, and I think about twenty-four inches long. The pot was underneath the bottom roller for the glue to be drawn in from. This glue pot was supplied by a pipe from one or another of the nine steam jacketed kettles above. If the glue was a very heavy mixture, would not flow through the pipe, so we had to dip it up and carry it down by hand and pour it into the spreader below. As to what difference there was, if any, in the way in which the roll acted when the glue pot of the spreader was filled with Perkins' mixture, as compared with the way in which it acted when the glue pot was filled with casein, it was altogether different. We had to readjust the machine. Had a pair of strings to hold the top roller up to keep it from being too close to the casein and taking the springs and put-

ting it on another way to hold part of the weight up with these springs so it would put enough of the casein on the machine, and changed the springs so it would have more pressure on the roller, so it would not put on too much of the Perkins glue. There was no other change made in the spreader that I remember of. If we put too much of Perkins' glue on it would wet the veneer sheet and it would not set. It would not stick. The Perkins would act differently with wet veneer sheets from what it would with dry veneer sheets. It would not stick at all with wet veneer sheets. If the stock is not dry there is not any glue that will stick to that wet stuff. It would not stick to green stock.

I could not state how long these early experiments of Mr. Perkins continued, exactly; there was some of the stock shipped away and some of it was not. It was all the first experiments that was put away in the storeroom to see what the result would be. I do not know how long it stayed there in the storeroom, but some of it was shipped out. Some of the glued heading was put in a car and shipped to Brooklyn. I think it must have been sometime in May or June before we had a carload of it; I could not say positively.

After these experiments with Mr. Perkins, they went to work and made long tanks, after they found out that they could not supply the small tanks enough to make a shipment they decided to put in the larger tanks and we give a contract to the Walker-Garretson Manufacturing Company to put in two large tanks so we could mix enough Perkins glue to make a day's run. We wanted to give it a test out [fol. 622] so we changed all of the glue spreaders at once and mixed the batch in the large tanks, and we—I am not sure about that. I think we used that for a day or two and then we dropped back on to casein again, of my recollection. We did not take out the old glue pots for some time. We kept those after, for quite a while. The two large wood tanks were never used for mixing casein glue. They were not suitable for it because casein was a hot mixture. The company is using the two large tanks today, but they have not been in continuous service for mixing glue since their installation, with the exception of such periods as the glue department may have been shut down. After the tank was installed my recollection is that we used them a while and then we dropped back on casein glue for a while.

The Perkins mixture was a very heavy mixture and would break the agitators in the tank. We had more or less trouble for that long, for quite a while. We overcome this trouble of having the agitators break by a new equipment with new gearing and new shafting and new agitators. After we changed the machinery so we could mix the glue, it was too heavy to flow through the pipes and Mr. Perkins suggested that we change the formula to more water. We had to adopt this suggestion. I disremember the dates when this change was made; sometime near the time when the tanks were installed. The effect of increasing the quantity of water in the mixture was, we found it had a very bad effect on the sticking qualities and also the setting qualities of the glue. I think by that time Mr. Perkins had ordered some different kind of glue from—I could not say where—and he told me at the time that he could cut out some of the water and make the glue flow with less water. And that was done about the time this experimenting was going on. I do not remember the dates. The changes were made from day to day. Always making changes in something to make the glue flow through the pipe. We had quite a trouble in changing from casein to Perkins' glue. Our former retainers would not supply the day's work without taking down some of the bales that were put up that day, and we found Perkins' glue would not set sufficiently to allow that. Or, rather, allow — to be taken down the day they were made. This retainer is the retainer that holds the glued stock together in bales until the glue sets. With casein, using a hot mixture, the glue would set quick enough for us to use the retainer again the same day. But during this experiment with the Perkins glue we found we could not take the bales down in less than twenty-four hours. I [fol. 623] disremember what change, if any, was next tried because Mr. Perkins was doing all that trying out himself.

It was finally decided that we would change all the spreaders, get new retainers enough to supply a day's work, and start in using Perkins' glue regularly. But I could not say about the dates when that change was made. I think Mr. Perkins was present at the time.

After I first met Mr. Perkins, about February, 1905, I think he was here in Poplar Bluff all the rest of the month of February and March, I think; I could not say positive,

but I think he was here the most of the time the following March and quite a lot of April.

As to the date of the decision in respect to using the Perkins glue regularly, to the best of my recollection it was sometime in the latter part of March, 1905. After arriving at this decision the change was made, retainers got and we started in to using Perkins' glue regularly, and continued it, I think, until they shut down in August, 1905. At the date of the shut down, I think there was some Perkins glue on hand I do not know how much. It was kept on hand until they resumed work later on and it was used up in the regular way; I think the first shipment of Perkins glue was received in small quantities. I disremember how long they continued to buy in small quantities. We finally got to buying in carload lots, but I disremember the dates. I disremember when we discontinued to use Perkins glue. As to what glue was used after this discontinuance of the Perkins glue, I think it was the same as we are using now, the Solva.

After we quit using casein glue; we had a carload on hand, and sometime along during the time we were using the Perkins glue regularly, we used up this carload of casein glue. I think they tried out another different kind, or silicate of soda, between the time we discontinued the Perkins glue and adopted the Solva glue. I could not place the date without I had something to refer to. The Perkins glue was used regularly for the gluing of wooden veneers for barrel headings, at least as long as a year, at this Poplar Bluff plant. I think it was used as long as two years, with the exception of shut downs of the glue room. It is my recollection it was used as late as 1908.

This Perkins glue came to the Poplar Bluff plant in powder form, dry powder form or flour, which was white. It looked very much like ordinary wheat flour, while some of it was more brownish. It was shipped in ordinary burlap bags, part of which were marked by numbers. All of the first shipments were marked by numbers and letters also. Part of them were marked "L" and part of them marked [fol. 624] "H." This signified light and heavy. A light body means thin; it was mixed thin with the same amount of water that was put in the heavy. In other words, if

ou mix it four parts of water and one part of glue, it ould mix very thin, and if you would take the heavy, the ne that was marked heavy, it would mix heavy with the ame proportion of water. The word "light" indicates hat the glue when mixed with a good deal amount of ater would be more fluid or liquid than a mixture result- ng from the glue marked heavy, mixed with the same mount of water. We could use both kinds in one mixture. We would find sometimes that too much heavy, with not enough light, would make the glue kind of sloppy like and would not set. We would find it would not set ready enough, and we would change the proportions the other way again, using more light and not so much heavy. I disremember exactly the proportions of light and heavy that we decided to use regularly. But we did decide on some proposition that we considered the best to use. Mr. Perkins made the first formulas to go by. We did not have more than one formula, but we made some little changes. The proportions of water and glue were about the same all the time, but the proportions of light and heavy bodied glue were changed from time to time, under Mr. Perkins' direction, while he was here. I never made any changes in the mixture of the glue without authority from Mr. Perkins or the office. As to the formula which was finally decided upon and was actually used in this Poplar Bluff plant, the proportions of water were four to one. The light and heavy bodied, I could not say. The records will show the pro- portion of the light and the heavy; I do not remember.

We continued to receive Perkins glue in bags that were marked light and heavy, I think, up until 1909 sometime, when they were changed to all in one bag marked "Per- kins"—I am not sure of this now—the bags came marked "Perkins Glue," with "Patent Applied For," or "Pat- ented," I am not sure which.

I supervised the mixing of Perkins glue at this Poplar Bluff plant. In doing this mixing the first thing is done is to draw so much cold water into the tank; if we were going to mix a thousand-pound batch of glue, of course, we would draw in four thousand pounds of water, pour in a thousand pounds of dry glue. We turn the steam into the tank and heat the water to 110 degrees Fahrenheit and stir the glue until it thoroughly dissolves. With a mix- ture of this size we dissolve seventy pounds of solvent into

a separate tank into two to one of water; we stir that until [fol. 625] it is dissolved. After this solvent is thoroughly dissolved it is poured into the large tank very slow until the glue is thoroughly dissolved; we stir that for about two hours and the glue is ready for use; that is, the solvent is mixed with water before it is poured into the tank containing Perkins glue, the proportion of the solvent to the water in which it is dissolved being about one-third or about two to one. We get it in just as small amount of water as possible so it will thoroughly dissolve. The proportion of water used in the tank to the glue that is added thereto is four pounds of water to one pound of glue and the proportion of the dry weight of the solvent to the dry weight of the Perkins glue is seven per cent. We have always used that per cent of solvent all through Perkins glue and the present mixtures, as far as I know. We have always followed the practice of mixing the dry Perkins glue and water first and then afterwards pouring into such mixture the dissolved solvent. The slower we put the solvent into the mixture of glue and water, the better it dissolves; if you pour it too fast it seems to clabber the glue, and I don't know that it does any particular harm, but it seems to stay on top and not go in. This solvent was in the nature of granulated form. I believe Mr. Perkins called it soda for a while. In the handling of it it was very severe; it would burn your hand; it was very strong. You had to be very careful — to touch your hands to it in the dry form and also in the liquid form; after it was dissolved in the glue the men handling the glued sheets would have to wear rubber gloves so that it would not burn *so* their hands. I learned that this solvent would burn a man's hands unless they wore rubber gloves, in the first batch we tried. When we used the first batch the men on the press did not know that it would burn their hands, so they used the entire amount of glue of the batch and did not discover it would burn their hands until the next morning, when they discovered their hands were so sore they could not work. I did not myself have any experience with this caustic action of this solvent. I did see the hands of these other men that had been handling the solvent. To protect the men in their work about the glue spreader, we bought rubber gloves for them. Rubber gloves had never been used about the plant for any purpose

before that I know of. The first I bought myself in the way of a finger stall. The next was bought by Mr. Perkins and from that time on I think the company bought the gloves. Lowell M. Palmer Company it was then. The men who handled the glued sheets used the gloves and they [fol. 626] continued to use them all the time, all that was working in the glue. That practice continues at the Poplar Bluff plant today.

All the time we used vegetable glue we used the same solvent, and we have been using vegetable glue from sometime in 1905 until the present time. The solvent has been bought from different companies. As far as quality is concerned, I could not tell any difference. The way of dissolving has been the same. The solvent bought from one company seems to operate the same way as the solvent bought from other companies. I could not see any difference either in appearance or action of the solvent that we used in 1905 from those of the solvents bought afterwards. I could not say what firms furnished solvent to the Poplar Bluff plant. One was a St. Louis concern and one was a Chicago concern, I understand. The first solvent was brought here by Mr. Perkins.

I do not know what material the Perkins glue was made from; only just by hearsay; Mr. Perkins told me at one time that it was made from a Cassava root, but he did not tell me how it was made or anything of the process of manufacture. As to conversation with Mr. Perkins with reference to the manner of using his glue after it was delivered to the plant, there was quite a lot of talk back and forth about the use of it. In the first experience there was something said in regard to the proportion of solvent to the dry glue. We tried as high as ten per cent. We tried hot mixtures and cold mixtures; tried the glue at ten per cent, hot mixture, and ten per cent cold mixture; tried it down as low as one per cent solvent. We found we could not do that in the wooden tanks, the heat was too great and would spoil the wood tanks. Mr. Perkins arrived at the seven per cent of solvent. I just followed Mr. Perkins' instructions. During the experiments I had instructions from the superintendent to do just what Mr. Perkins said. I knew at the time about these changes of proportion

of the solvent and took part in the experiments; done all the weighing myself. As to whether we ever had any need for the help of Mr. Perkins in using his glue after he discontinued his experiments and left the Poplar Bluff plant, I would say very often we would have trouble and he dropped down here to see what was the matter with it. It did not seem to be uniform; we would mix one carload and get in another carload. It would not be the same. As to when this difficulty arising from lack of uniformity ceased, after we began to get it in one bag we did not have any trouble with it. It seemed to be the light and heavy body [fol. 627] stuff; it seemed that when we would get a new shipment what was marked "L," it would not be the same that was marked "L" in the other car; the same way with the "H." The numbers would not be the same on the bags, kept getting me into trouble all the time. The trouble never was stopped until we got it all into one bag and it was proportioned at the factory instead of I would do it at the mill. That is about when the trouble ended, as far as the light and heavy body trouble was concerned. I do not know who was responsible for having the mixtures made at the mill. As to whether or not the proportions of the light and heavy bodied materials were specified in ordering the glue, it was up to the time it was all put in one bag. As to when was that time, when they began mixing it up at the factory, I do not know exactly the date. It seems to me it was along in the latter part of 1909.

While we were having our trouble in proportioning the light bodied and the heavy bodied glue, we did have to throw away some of the stock, the finished heading. When I would find that the glue was not running just right I would run the tanks together and use the glue from both tanks at once together. The glue business is a very funny business; you glue up the stock one day and take it down the next, and we can't tell what the results will be until you take it out of the retainers. Probably it will show up bad and spoil a carload of stock before you know it; that is the reason why we made this in small tests and until we were sure what we were doing. I do not wish to convey the impression that we wasted carloads of stock in a single day; I was trying to prevent the wasting of stock. A great deal of our trouble came from a lack of uniformity in the

materials furnished. We could find out by experiments the proper proportion to use of the given lot of the light bodied material and of the heavy bodied material, and thus get satisfactory results with that material. I do not think any of the Perkins glue that we handled at the Poplar Bluff plant was ever shipped back. A great many times we would have to order more with what we had on hand to make the proportions right. It seemed that one batch would be all right and give satisfaction, and maybe the next one would not.

As to whether I meant to say that we continued to use the glue that did not satisfactorily hold the veneer sheets together, I mean to say this: That I was instructed to use the glue and naturally I was doing the best I could with it. The way in which the glue was conveyed to the spreaders [fol. 628] and the way in which the spreaders applied the glue to the wood had something to do with the trouble. The light and heavy glues were never properly proportioned, that is where my trouble was; I was never able to get them properly proportioned. It was on account of the manufacturing end of the glue, the bags would be numbered probably the same but they would not be the same. I mean this: That in mixing a thousand pounds of glue we would put in five 200-pound bags; it is my recollection that we put in three of heavy and two of light. And maybe that would work all right for a while and then it would seem to change on me, and I got disgusted with it, and told Mr. Perkins to come down and try it himself. About that time there was some discussion about him putting it all in one bag at the factory, and it was taken up through the office and they talked it over. A heap of times we would never know anything about stock being glued bad until we would get a report from New York, where the stock was unloaded. That was taken up through the office, of course, here, and was taken up with me in the mill.

As to our present practice in respect of ordering vegetable glue, when the stock of glue runs low, I just notify the office to order another car of glue, nothing specified about the kind, only tell them we want just as good as we can get.

It has happened nowadays that the glue is too light or too heavy, and on such occasions I do like I did when

I was first experimenting with Perkins glus, I proportionate it. I never had that trouble but once, don't believe I had that trouble with but one carload, and that was quite recently. I am overcoming that trouble mixing it one bag to four ordinary stuff and the product is shipped out of the Brooklyn Cooperage Company.

Cross-examination:

As to the numbers which were marked on the bags shipped by Mr. Perkins, I do not believe I call them to mind; very many of them at least. It seems as though we had some marked 95. My recollection is 68, and quite a few other numbers, I do not remember. I am not sure we used those numbers at Poplar Bluff. I know there was some such numbers used in other places. I think we got quite a lot of glue marked 55 something. I do not remember 57. I have no positive recollection of 66. I know there was a lot of those numbers, but I am not sure of what they were. I knew at the time what they all meant, but I do not remember now what they were. I remember [fol. 629] 95 was a very heavy bodied glue; 71 was, as I recollect, a light bodied glue; 55-5 was a peculiar kind of glue; it will keep it from being so stringy. That is all I recollect of the numbers. A great deal was shipped in barrels and it had numbers on it, but I disremember what they were.

Regarding letter dated November 14, 1906, I wrote that letter to Mr. Perkins when I was in Cairo, Illinois. I went to Cairo to help Mr. Perkins try out his glue at the plant of the Singer Manufacturing Company in Cairo. At the time that I wrote that letter they were just getting ready to start using Mr. Perkins's glue at the Singer Plant in Cairo, just installed the iron kettles—tanks we call them—and was waiting on some part of the spreader which was broken in shipment, and was getting it repaired, I suppose. There had not been any test made at that time, as far as I know. Mr. Perkins employed me to go over to Cairo to help him out on this work.

(The letter of November 14, 1906, marked "Complainant's Exhibit No. 11, Baker's Letter.")

Regarding letter dated December 30, 1906, I wrote this letter to Mr. Perkins while I was in Cairo. In this letter I spoke of "desired changes in our formula and think it will be good." It seems that it was some changes in the proportions of the light and heavy body, the way the letter reads. That is all I have got to go by is the letter. It was a change in the formula for mixing Perkins glue. My recollection there, the 95 was very heavy and the 68 was the light. From the change in the formula mentioned in the letter, Mr. Perkins was still having trouble with his mixtures, and I and he continued to make changes in the proportions of light and heavy up to this time.

(Letter of December 30, 1906, marked "Complainant's Exhibit No. 12, Baker Letter.")

Regarding letter dated December 10, 1906, I wrote this letter to Mr. Perkins when I was in Cairo. At that time I was trying out the mixture mentioned in that letter. In the letter the different lot numbers or bag numbers which went to make up the mixtures were 95, 83 and 68, and there was another marked "Gum," and the numbers opposite these lot numbers, that is, 240, etc., indicate the relative number of pounds of each kind in the mixture.

[fol. 630] (Letter of December 10, 1906, marked "Complainant's Exhibit No. 13, Baker Letter.")

Regarding the letter dated January 11, 1907, I wrote this letter to Mr. Perkins. It seems they had made some mistake in the mixing also by getting it too hot.

(Letter of January 11, 1907, marked "Complainant's Exhibit No. 14, Baker Letter.")

Regarding the letter of February 14, 1907, I wrote this letter to Mr. Perkins. The new spreader refer-ed to in the letter was a new form of spreader. The letter states: "We put in a batch of the new formula and they are using it today." It seems as though from these letters that I have had instructions from Mr. Perkins to try out a new formula and I had done so.

(Letter of January 11, 1907, marked "Complainant's Exhibit No. 14, Baker Letter.")

Mr. Perkins was here in Poplar Bluff a great deal of the time, at least in February, March and April, 1905, and Mr. Perkins also came back to the plant in Poplar Bluff a number of times after that to try and clear up troubles we were having. I remember at one time Mr. Perkins tried to put in a solvent to prevent the acid eating the men's hands.

When I went to Cairo to help Mr. Perkins try out his glue in the Singer plant there we used a very different formula from that we used first at Poplar Bluff. After the first experiments with Perkins glue at Poplar Bluff there was a considerable amount of casein left on hand for the purpose, so if Perkins glue did not seem to be a success we could fall back on the casein. I remember very distinctly that the superintendent said he did not want his casein to run down lower than a carload, because it takes about thirty to sixty days to get another car.

In our work at the Singer plant in Cairo we finally got a much better joint than we did at Poplar Bluff. I do not remember whether Mr. Perkins had some solvent come in iron drums at one time. He had some water-proofing that came in barrels. As to his using various chemicals besides the so called soda in his work at Poplar Bluff, why, he came to the drug store very often and got some stuff, I do not know what it was, and put it in the glue; I do not know what the effect was nor what the desired effect was. For quite a while he had trouble with the time required for the glued up heading to set with Perkins glue at Poplar Bluff. I believe at the start there was some of the glue [fol. 631] shipped by Mr. Perkins to Poplar Bluff that was granular in form, but not very much of it. I remember that quite a while after Mr. Perkins started at Poplar Bluff that either the spreaders or the rolls on the spreaders were sent over to Mr. Perkins at South Bend to be built over or improved. The entire machine was sent.

Redirect examination:

As to the product that was being manufactured at the Singer Manufacturing Company plant at Cairo while I was there, this, to the best of my recollection, they called "Table Tops," used for sewing machines. My recollection is that they used five-ply of gum, about one-eighth of an inch thick,

to veneer with. Each veneer was about one-eighth of an inch thick. They finished that on each side with one-twentieth of an inch veneer, to the best of my recollection. It was very thin. These table tops were built up out of gum, five-ply, and belted up in retainers and let dry for at least two weeks, is my understanding. Then they would take them and re-glue them on the outside and lay on the thin veneer on each side, sometimes of oak, some walnut, some maple. This thickness of one-twentieth of an inch is very much thinner than the veneers used at the Poplar Bluff plant, where the thickness of the veneers was five-thirty-seconds of an inch. This difference in the thickness of veneers has significance in the operation. In the Poplar Bluff stock five-thirty-seconds of an inch would make the veneer stiff enough so it would not roll up around the roller of the spreader. The one-twentieth of an inch of veneer at the Cairo plant was very thin and delicate and would roll up around the roller of the spreader. Now, I am—I am not sure the thin veneer was put through the machine at Cairo. I know it was at South Bend. We did a lot of one-eighth gum sheets at Cairo that acted a good deal the same as the Poplar Bluff veneer.

The requirements of the finished product of the Cairo plant made it necessary to take precautions that were not necessary in manufacturing the products at the Poplar Bluff plant. In laying on the thin veneer on the table, to build up a table with Perkins glue, caustic would stain through where the per cent was too large; also required a much stronger joint. To meet these requirements at Cairo we only used one-half or one per cent of solvent where at Poplar Bluff we used seven per cent and reduced the amount of water at Cairo. I disremember what the amount was we used. When we reduced the amount of caustic at Cairo, to [fol. 632] offset the reduction of the caustic we made a hot mixture instead of a cold mixture. It was rather mixed by heat instead of solvent, that is, dissolved. One of the purposes of reducing the solvent was to prevent the stain that would show through this very thin veneer of the finished sewing machine table.

This experience at Cairo did not cause us to change our formula as used at Poplar Bluff.

Regarding the leaving of the unfinished tops at the Cairo plant in the retainers for at least two weeks before the fin-

ished veneer was applied, I did not intend to convey the impression that they were left in the retainers. It was taken out of the retainers and stacked up in stacks and dated. My recollection is that we put dates on the stacks to show when they were glued up. It was taken from these stacks and run through the sanders to put on a smooth finish before the outside veneer was put on; that is my recollection. I do not know why they were left in the house so long only to be thoroughly set before being put through the sander, as the sanders were a very severe test on the glue.

Referring to the use of a smaller proportion of water at Cairo than was used at Poplar Bluff, the reason for this difference was to make a stronger joint. A stronger joint is required for sewing machine table tops than is required for barrel headings. You get a stronger joint when you reduce the amount of water. When you reduce the amount of water it mixed very heavy. The less water the heavier the glue. It makes it very still-like and also stringy.

My experience at Cairo did not cause me to change the proportion of water to the glue as used at the Poplar Bluff plant. No change that I know of was made in the proportion of ingredients in the formula at the Poplar Bluff plant after my experience at Cairo.

After my experience at Cairo we continued at Poplar Bluff to use the same formula and practice the same process in a general way. Of course, as I said before, we would change the amount of light and heavy bodied, but not the amount of weight of glue. I think we used the same proportion of light and heavy in cold weather that we used in hot weather. It is my recollection, and it is so today, that in winter the glue runs heavier than it does in the summer. If we want to secure uniformity of the glue in winter and in summer, we would do it with heat, heating the water. The difference in heating the water would run all the way from one hundred in summer to one hundred and twenty in the winter time.

[fol. 633] As to changing our formula so as to use some light and less heavy, the result would be to get quicker set and less slobber of glue on the stock.

I identify letter of May 30, 1907, received by me from Mr. Perkins.

(Marked "Defendant's Exhibit 20, Letter of May 30, 1907.")

Recross-examination:

As to reducing the amount of water in the glue, if you reduce the water too much it would make it so you could not use it at all if you reduced it too much. We had some experiment batches of work that way. I do not remember how much water we used in these.

We used quite a different formula for mixing the glue at Cairo than we did at Poplar Bluff.

I remember of gluing up some small thin samples of walnut veneer as a test one time at Poplar Bluff before I went to Cairo. I do not remember what the result was.

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Deposition of James R. Pearce, a Witness Produced on Behalf of Defendants March 26, 1914

I do trucking of veneering at the Poplar Bluff plant of the Brooklyn Cooperage Company. I have been employed at this plant since December, 1902.

I know a Mr. Perkins; we call him "Glue" Perkins. I first met him, well, it was in 1905, I guess, along in the early part of 1905, at the Brooklyn Cooperage plant. My understanding was that he was there to introduce a new glue. The first I knew of it, Mr. Baker told me that was his business; that he had the glue, samples of the glue, in some bottles. That is the first of the glue that I knew anything about. I went upstairs and seen the glue that was in the bottles. Well, they went to work and fixed up a pot that they had used for mixing casein glue in, and they mixed this glue in that pot and carried it downstairs and poured it in the glue machine, some with buckets and some down with tubs. There was one batch of that mixed, I won't be certain that it was every day, for some time. This glue machine consisted of a lower pot that the glue was poured into, and there was two rollers to the machine, one right above the other, the lower running through the glue, and the upper roller taking glue from the lower roller, that is, the machine. The veneer was fed to the machine by

hand by a man, pushed into the machine endwise between the rollers. The upper roller received its glue off the lower [fol. 634] roller. The glued veneers that were delivered by this gluing machine during the early portion of the time that Mr. Perkins was at this plant was taken from the machine, from the rollers, and placed in a press between the dry sheets of veneering. There was twenty—there was thirty-eight and sometimes thirty-nine sheets put into a bale; then it went into a hydraulic press and was bolted up and pushed out on a conveyer and set out in the room and was allowed to set twenty-four hours before taking down. After they was taken down they was taken to the turner and a barrel head burned out of them. There was three layers of veneers in one of these sheets. The barrel heads were bolted up and put into a bale and sometimes they were loaded into a car; sometimes they were stored into a storage shed.

During the time when Mr. Perkins was at the plant the veneer sheets were tested after they were glued, by tearing the sheets apart. The purpose of these tests, well, it seemed to be to find out whether it was going to stick or not. As to whether any test was made to determine the drying quality of the glue, well, I don't know about that part of it now, the drying part. All of the tested sheets were not of the same age. Each batch of mixture was tested, but I don't know how often. It was not every day.

As to keeping these veneer sheets different lengths of time before testing, well, they would let it only stand in the bale twenty-four hours and then take it down and test it; after these tests they went right ahead to using it. As to what extent they used Perkins glue, well, I couldn't say exactly how much they used, but I supposed it to be about fourteen hundred pounds a day, after they commenced to using it steady. As to how long they continued to use Perkins glue regularly, well, now, I couldn't tell you; that is the point that is hard for me to tell. They used it quite awhile regularly; then the mill was shut down about nine months, shut down and then when they started up again they still used the Perkins glue. There was some Perkins glue on hand during the period of the shut down. We used it up when the mill started up again. I do not know why it was shut down. My understanding was that

it was an overstock of heading, that is, barrel heads, glued heading. We continued to use Perkins glue when we resumed work after the shut down, for a while. As to what kind of glue we used after we ceased to use Perkins glue, I don't know; if I heard the name I have forgotten, if it had any name. As to when we began using the glue that is [fol. 635] now used at the Brooklyn Cooperage plant, well, I can't tell you exactly; seems as though it has been a year and a half ago; I wouldn't be positive about that. As to how long it was after we quit using Perkins glue that we began using the glue that we now use, I could not say for certain whether we went off of Perkins glue and right on to the glue we are using now. They had a fellow in there to introduce a glue they called silicate of soda.

As to the kind of wood used in making these veneer barrel heads, we used some black gum, mostly sweet gum. It made some difference as to the sticking power of the glue whether the wood was green or dry. If the wood was green the glue would not stick, and if the wood was dry, if it would stick at all, it would stick.

I remember something about wooden tanks being installed at this plant. I was there when they was building the tanks. I think Mr. Perkins was there at the time. As to the capacity of the tanks, I could not tell you; that was several thousand gallons, but I cannot say exactly. These tanks were used to mix the Perkins glue in. They was used from the time they were built up to the present time. As to the kind of tanks used for mixing the casein glue before Mr. Perkins came to the plant, they used an iron pot. We had nine of them. They are at the plant yet. These iron pots were steam jacketed kettles. They could still be used for mixing glue by refitting them again. That would require the steam pipe being fitted back to them; that would be a very simple matter.

I remember something about rubber gloves being used at the plant. When they first commenced the Perkins glue steady, the boys' fingers got sore that handled the glued sheets, and they didn't know what was making them sore, and Mr. Perkins said that the—I won't say that he did say it, I don't know that I heard him say it—Well, anyhow, Mr. Perkins got some kind of dope up town for the boys to use on their fingers to keep the soreness down, and

that didn't seem to do any good, so the rubber gloves were brought into use. The boys continued to use rubber gloves in handling these glued sheets all the time they were using the Perkins glue, and also using them yet on the present glue that they are using.

As to whether I ever had anything to do with unloading the shipment of glue and solvent, I never had any with the solvent; I helped unload several carloads of the glue. All that I helped unload was in sacks; it looked like flour. [fol. 636] From the time that we began to use the Perkins glue steadily, it continued to be the same glue, so far as I know.

Cross-examination:

I worked in and out of the glue room. While I was in the glue room my duty was to put the veneer up to the glue machine, also bolts in the rack for the retainers. I never had anything to do with the mixing of the glue, so that I would know nothing about as to how the glue was mixed; I do not know the form of it. I was working in the glue room during the first two years they were using Perkins glue. I do not know just how long they used it. I was working there all the time that they did use it.

The veneering was stacked outside of the glue room. I loaded the veneering and hauled it into the glue room, and then I set the truck that I had loaded up to the glue machine. That is what I meant by my duties in the glue room. I also fed the machine, the glue spreader, three or four weeks, while one of the men was sick. I could not tell you just when it was, but I am positive that it was while we were using Perkins glue.

As to my knowledge of any troubles they had with the spreading or sticking qualities of Perkins glue, I do not know about the sticking qualities so much; there seemed to be a right smart of trouble in the spreading of the glue while using the old machine. After they got the new machine, it spread a good deal better than the old machine. It was a right smart period after Mr. Perkins started before they got the new machine. I do not remember how long it was.

As to whether I know anything more about the troubles they had with the spreading or sticking qualities of Per-

kins glue, well I don't know; I don't know of anything. There might have been more troubles with Perkins glue that I would not have known about. I knew that the glue on the spreader looked differently, that is, had different shades or color at different times. I knew that it was thicker at some times than others. As to whether Mr. Perkins at various times sent different kinds of glue there, for instance, marked with different numbers or letters, I helped unload glue marked with different letters on the sacks. One sack would have II on it, the other would have the letter L. I never noticed any numbers on the sacks that I remember of.

I noticed sometimes while using Perkins glue that it would run stringy or short as it ran in the glue spreader.

[fol. 637] Redirect examination:

As to whether I noticed any variations in different shipments of the glue that we are now using, I would say in one shipment especially, the carload that we got before the last carload, the carload before the last car that we got, seemed to be an awful heavy glue, so heavy that we could not get it through the glue pipes lots of the time, without blowing it with steam. The last carloads seems to be the same glue that we first got of this new glue we are using.

As to whether down to the present time there continued to be variations in the different shipments, I would say there was only the one shipment that I could see any difference in; that was the next to the last carload.

There is a wide range of difference in respect of the kind and of the condition of the wood used in these veneer barrel heads from time to time. There would be several conditions of the wood. There is a difference in the wood. There is so much difference in timber and different kinds of timber and conditions of timber that I do not know what you are driving at.

As to whether I found the changes in the Perkins glue, from the time that we began to use it regularly, amounted to more than the differences in the wood we were using, I would say, well, I don't know that there was.

Recross-examination:

I remember that after several years that finally the Perkins glue all came in one kind of bags; that there was no

longer different bags marked L and H. I remember that after that Perkins glue ran more uniform; that is, after that we did not notice the changes in shade or color and thickness of the glue.

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DEPOSITION OF JAMES G. GREENUP, A WITNESS PRODUCED ON BEHALF OF THE DEFENDANTS MARCH 26, 1914

My occupation is cooper at the Brooklyn Cooperage plant. Have been employed at the plant since 1899. As to whether I ever had anything to do with the glue department, it was first in 1901, in the glue, making heading. I knew of Mr. F. G. Perkins being at the Poplar Bluff plant. This was either in the latter part of 1904 or early in 1905. He was introducing his glue. He had glue brought here and mixed it out in the plant, and we used it; then the heading was tested for its sticking qualities from time [fol. 638] to time. This Perkins glue was mixed originally upstairs in iron tanks we had been using for mixing casein glue in. The Perkins glue that was mixed in these iron pots, the first mixture they rubbed on the sheets of veneer with their hands, and then put them in the press, between two other dry sheets of veneer and baled it in bales of casein glued headings. These hand glued veneers were kept in the press about a minute, retainers put on, bolted up, and took to the stacking room, and remained there twelve or fourteen hours; they then were tore apart by Mr. Perkins and Mr. Baker—I mean Mr. Frank Baker—for the purpose of testing their sticking qualities. As to further tests, well, from time to time they would make bigger batches of the glue and use it through the glue machines, spreading machines, and tested, as before stated. After these tests had been made, they decided that they could not use his glue to his satisfaction in those small iron pots; they then made arrangements for the wooden tanks and got two wooden tanks of large size from Mr. Walker. They continued to use these large wooden tanks for mixing the glue in as long as they used Perkins glue, about six or seven years.

The first Perkins glue might have come in barrels; I can't exactly remember. It was mixed with water and the glue and solvent. The glue came in powder form. After

that it came in sacks. Some sacks had the letter H on them. Some sacks had the letter L on them. I do not know what these letters signified. You could not tell the difference in the looks of it. There was difference after they were mixed in the water. The H glue was a thicker glue, a heavier glue when mixed, than the L glue. Sacks of H glue were mixed with the sacks of L glue in the tank at the same time. Water was first put in the tanks, then the glue, dry glue. Then the solvent in liquid shape. The solvent did not come to the plant in liquid form. It was white, similar to concentrated lye, only thicker, looks like lye looks after it has stood in the air for a length of time. Then it is dissolved in water and run into the glue.

It was the practice of the Perkins Glue Company to prepare the glue in the way I have described, all the time we used it. As far as I know, the solvent was run into the larger tank through a small iron pipe, about one-half inch. To the best of my knowledge, it would ordinarily take about one hour for the solvent to run into the large tank. During this hour stirring was continued in the tank.

[fol. 639] I remember about the rubber gloves used by the men in the glue room. We used rubber gloves. There was some ingredients in the glue that burned our hands. Mr. Perkins bought the gloves first, and we used them from that time to this.

Cross-examination:

As to whether all I know about the mixing and use of Perkins glue is what I just happened to see others doing as I might happen to go into the glue room, I would say that what I know about is what I seen. I do not know anything about the various changes in the methods and formulas of mixing which were made under Mrs. Perkins' direction from time to time. As to whether my work was as cooper was not in such a place in the plant that I could see them during the mixing, while I was doing my work as cooper, I would say that at times my work came in contact with them, not often.

Redirect examination:

As to whereabouts I was working while Mr. Perkins was at this plant, I would say on the glue press. It is a machine

we have to press the heading together so that they can get the right sticking power. There was three of us in a crew. There was one man feeds the glue machine with veneering. Another man on the other side takes the heading out of the glue machine and puts it in the press between two dry sheets; there is one man puts the two dry sheets in the heading press. It takes three men to work at the job. I worked on the dry sheet side principally. I work wherever I am needed the most in making the heading. My duties and position were such that I would be familiar with the work being done in the glue spreader. As to whether I ever did work on the glue spreading machines, I would say yes. I sometimes fed the glue machine, sometimes loaded up the dry sheets in the press, and sometimes handled the glued sheets as they come from the spreading machine. I continued to be one of the crew that did this work all the time. It was the feeder's duty to see that the proper amount of glue is in the tank of the glue machine. The feeder was one of the crew of three. When I acted as feeder from time to time I performed this duty.

As to where we were stationed with reference to the mixing tanks, we was right under them. They were built upstairs, right over us.

On occasions I did have occasion to go into the mixing room.

[fol. 640] Recross-examination:

As to my duties as cooper they are at the present time making glue heading; that is, at the present time I put dry sheets on the glued sheets. I remember that at various times after they started using Mr. Perkins' glue, that the glue would come down to the spreader in different shades or colors. As to whether for quite a while after they started with Mr. Perkins' glue they had considerable trouble with it, I would say at times they did. As to whether Mr. Perkins made several visits to the plant after his first test, to try and overcome these troubles, I remember of him making several trips through the mill, I suppose for that account.

Redirect examination:

As to what change, if any, was made in the machinery after Mr. Perkins visited the plant on these later trips, I would say the machines were sent off, re-worked and turned around opposite from the way they was, and another glue pot added on top of the top roller. After this much trouble as before with the glue. It spread in a way change in the machinery was made we did not have as that there was not so much waste of the glue. As to what I mean by "waste of the glue," well, before they made the change of the machines, the old machines before they were worked over, put the glue on the heading in a way that it would sling all over everything and run all over us. This trouble was avoided by a change in the machines. One of these changes consisted in providing a glue tank, glue pot, for the upper roll of the glue machine instead of feeding the upper roll from the lower roll.

As to whether the veneer heading did stick any tighter after the machines were changed, I would say no, not as I could tell.

As to what was this change of color, I don't know which you mean. I spoke of two changes of color, one dry and one wet. From time to time there was changes in the color of the glue; sometimes it would be darker than at other times, as it came down the pipe. As to whether we ever reached a point after which the color continued to be uniform, I would say practically, yes. This was after we were using the wooden tanks, probably three or four months after.

My last few answers have related to the wet glue. I never did notice the glue change in the color of the dry glue at one time. There was one shipment a shade pink from what [fol. 641] we had been using. I do not know whose glue it was. I do not know whether this glue was the Perkins glue or not.

Re-recross-examination:

Regarding the glue being sloppy so that it run over the edges of the sheet and over the men, before we had the machine changed and the upper glue pot put on it, before

this change was made in the machine the glue was always sloppy like this. I do not remember that at various times before the machine was thus changed, that the glue did not slop very much. The glue always slung more or less until we changed the machine.

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DEPOSITION OF STEVEN JOHNSON, A WITNESS PRODUCED ON BEHALF OF DEFENDANTS, MARCH 26, 1914

I am a glue mixer at the Brooklyn Cooperage plant. I was connected with the plant in the first half of 1905. At that time I was the night man, cleaning up the glue room. During the early part of 1905 they were using all casein. Afterwards there was a change made. They used some glue they called the Perkins glue. It was used in a machine something like casein was put till we got a chance to have different machines. For a time the glue spreaders, they were originally used for spreading casein glue on the veneer sheets, were afterwards used in the same way for spreading the Perkins glue on veneer sheets; and afterwards different machines were used for the Perkins glue. The Perkins glue was prepared for use in the spreading machine, well, it was added so much water and so much glue, so much solvent. This mixing was done right there at the mill. The solvent was mixed in an iron tank and the water was drawn in a larger wooden tank. Then the glue was added to the water, now the solvent added to that, brought to a certain heat, and then it was ready for use. As to whether the mixture was stirred up at any time, it was mixed by the machine that stirs all the time. The solvent was first dissolved in water in a separate iron tank and then the solution was poured into the large tank. The Perkins glue was mixed with water in this large tank before the solvent was added thereto. The solvent runs through a pipe which leads into the large tank and comes out in a small stream into the large tank. Supposing we are making up a batch of fourteen hundred pounds of glue, then as to how many pounds of solvent would be dissolved in the small tank to be added to the large tank, well, I don't know, [fol. 642] I never mixed it that way. We mix five hundred

pounds and one thousand pounds and twelve hundred pounds. If we want to use twelve hundred pounds of glue, we would use ninety pounds of solvent. I do not know what date it was when the use of Perkins glue was discontinued at this Poplar Bluff plant. It was within the last few years. The character of this solvent that was used with Perkins glue was in the powder form. It acted like it was very strong stuff. I make that remark because it was very strong. It is like concentrated lye.

As to whether I know of any difference between the Perkins glue as it came in 1905, so long as it continued to come in bags marked H and L, well, I can't give my idea straight on that because I don't remember. I do not recall now any difference.

Cross-examination:

I was night man, cleaning up, in 1905. As to when I first started to mixing the Perkins glue, well, I can't give my—give perfect date on that, because I don't know. To the best of my knowledge, though, it was in 1909. It was certainly two or three years after Mr. Perkins started in 1905. I do not know anything about how the Perkins glue was mixed before I started in mixing it about 1909. I do not know anything about the different formulas and amounts that were used in mixing the glue before I started mixing it. I remember that in the early times of trying out Perkins glue, the glue came in bags marked L and H. All the bags was not alike, but as far as this L and H, I ain't positive about that.

During the last few years we used Perkins glue, as to whether it came in bags marked all alike, without the L and H, to the best of my knowledge, the last carload they had out there was branded different from any of the rest of them. It had "Patents pending, Frank G. Perkins." As to whether we had more than a carload of the glue branded in this way, I do not know. I would not be positive whether they did or not. As to whether I did any of the mixing when the bags were marked L and H, I do not remember whether I did or not. As to whether I remember about their having lots of trouble with the glue during the first two years they were trying Perkins glue, I would say no; I can't tell you about that. I was not doing their work after the

first half of 1905. There might have been lots of trouble during this time and I would not have known about it.

In my direct-examination, in describing the way Perkins glue was mixed, I, of course, was referring to the way it [fol. 643] has been mixed since I have been mixing it. I do not know whether it was mixed that way all the time before I started mixing it or not.

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DEPOSITION OF F. E. ROBERTS, A WITNESS PRODUCED ON BEHALF OF DEFENDANTS MARCH 26, 1914

I am now working in the dryers. I have worked at this Poplar Bluff plant about nine years and a half. I remember Mr. F. G. Perkins. I could not give you the exact date when I first met Mr. Perkins. The best I can figure out, it was in 1905, along the first of the year sometime. I met him at the Brooklyn Cooperage Company. I understand he was there to introduce some new glue. The first thing I knew about it he was there with the glue and they were preparing to mix some of it and try it out. They made the preparations upstairs in the old pots that they used for mixing casein and carried it down to us in buckets. The bucketfuls of glue thus mixed they put in a glue pot in the machine. The machine, it was a pot that we used, with two rollers in it. The rollers were arranged one right above the other, above the lower roller. The glue fed from the bottom roller to the top roller. The lower roller got its supply of glue, it was in the pot where the glue was. This machine spread the glue on the veneer sheets. One sheet was fed into the machine at a time. As to what was done with this sheet, why it was put into the press. While this sheet was in the glue machine, when we fed the sheet into the machine we were supposed to always dip the sheet in the glue because there was always a roll of glue between the rollers, and that was done in order to get plenty of glue on the sheet. This sheet was covered with glue on the upper side, as well as on the bottom side. Now, this is the old machine that I am speaking of. When this glue-covered sheet comes from the machine it is laid between two dry sheets and veneered and then placed in a hydraulic press in stacks or bales.

I could not say how long Mr. Perkins continued his experiments at this Poplar Bluff plant. He was there for some time off and on. As to my best recollection of the time when Mr. Perkins was there off and on, well, he first come, if I am not mistaken, in 1905, about the first of the year. Then he went away and came back several times, but I can't give the difference in time there was between his trips that he made there.

[fol. 644] After these experiments, well, it seemed like they began to prepare to use the glue, the best that I can recollect. As to these preparations to use Perkins' glue, well, the foreman talked about the plans they would have to make before they could use it, about the tanks, and so on. The first thing that I knew anything about is what I got from the foreman, just hearing him talking about plans they were figuring on to use the glue, about the size of the tanks and what sized pipes they would have to use. They did not add anything to their equipment by way of preparation to use Perkins' glue, that I know of.

As to whether anything was ever done about getting these tanks that I mentioned, I would say, nothing more than what I have stated, only just hearing the foreman talk about the plans they were laying for handling Perkins' glue. They did have these tanks installed. As to how these tanks differed from those that had been used for handling the casein glue, well, there was a good deal of difference. There was the pot that they used for casein was steel jacketed and the glue was cooked, while the tanks that were used for the Perkins glue was made out of wood and the glue was cooked by a pipe that went down in the water. I remember they used solvent in connection with this Perkins glue. The best I could explain, it was white and seemed to be a little in lumps, kind of lumps. I handled it just a little, not much. It would burn and it seemed like it was bad to inhale. I never had any experience with this solvent burning me, outside of the glue. I never handled it with my hands, only in the glue. By having this glue get on my hands after the solvent was added to the glue, I have had it burn my hands, that is, it would eat holes in my fingers with the glue. I overcome this trouble by wearing gloves. I think Mr. Perkins furnished the first gloves, that is, he give me the gloves, sent after them. I believe the first pair that he

brought me was a pair of kid gloves, and handed to me and said to try them. If I am not mistaken, that is the first pair he brought. These kid gloves lasted one-half day. As to whether Mr. Perkins ever furnished any more gloves, well, I would not be positive about that, but I believe Mr. Perkins came up here, at the store here in town, and got some rubber gloves. I am not sure about who got them. I never used rubber gloves in handling the veneered sheets until that time. I did use the rubber gloves after that time in handling the glued sheets as long as I worked there, which was about two years ago. As to whether I ever did anything with any of the solvent to test its qualities, I would say I brought about a quart can of it home and my wife made [fol. 645] some good soap out of it. It was hard soap, just as white as it could be.

As to the Perkins glue, I seen Mr. Perkins eat some of it and it was not poisonous; that was before there was any solvent put in it.

Mr. Perkins got some salve and give it to us to relieve the soreness of our hands.

Mr. Perkins told me the glue was a vegetable glue and that he raised it on a farm in Florida. I cannot remember the name of the vegetable. If he ever told me, I do not remember. He said the glue would make good pancakes and puddings.

I could not give exact dates as to how long they continued to use Perkins glue at this Poplar Bluff plant; but we must have used it six years or more, something like that. It come in sacks. There were letters on them, H and L. We called it heavy weight and light weight; that is what we used the letters for at the mill.

So long as these bags of glue marked H and L were being received, as to whether we noticed whether or not the material so marked continued to be the same, I would say, well, I noticed that sometimes we would get a carload of glue that would be different colors after it was mixed; we got some glue that after it was mixed looked a little pinkish color; that is about all that I noticed that was colored. It seemed as though it stuck as well as any of them. I could not tell any difference when it came to the sticking qualities. I do not know how often we received this pinkish glue, but it seemed as though it would last for about a week or such

a matter. It seemed not just one week only, but at a time, because they run three presses at that time. But I can't remember more than one or two batches that came that way. As to when it was that this one or two batches of the pinkish glue were used, I would say, well, it must have been a couple of years after the glue was introduced there, a right smart bit after Mr. Perkins left. As to whether, with the exception of this pinkish glue, did I notice any change in the glue so long as it was marked L and H, I would say the glue would come different at times, not in color, but we would get glue probably for several days that was harder to spread on the sheets than at other times, and it would waste more, that is, would sling off the sheet, would rope. As to whether these differences would run through the entire carload or would be different sacks or bags in the carload, differ among themselves, well, the best I can say about this, I could not say about the carloads because along at the first I disremember how long that we got four or five car-[fol. 646] loads at one time, and, of course, it was all put in the store room, so I could not say whether it all came out of one car or not, this bad glue that roped; that is, the carloads was probably mixed, but the H and L were kept separate.

As to the glue that roped and which I referred to as bad glue, I did not mean that it would not stick. It just made it bad on us men because it made the floor sticky. I think this ropy glue stuck as well as the other glue.

Cross-examination:

Referring to having bad glue about two years after Mr. Perkins started, as to whether I remember that they had various troubles with the glue during this period, well, I can't tell you positively whether I remember that or not. We would get word from New York every once and a while about the glue not sticking good. That is about all that I remember. There might have been lots of other troubles during this time which I did not either know about or have forgotten about.

My duties at the plant during the first two or three years Mr. Perkins was there was working on the glue spreader. I never had anything to do with or knew anything about the mixing of the glue at that time.

Redirect examination:

I knew that a solvent was added to the mixture. I know we first let water in the tank and when the water was let into the tank the next thing that was done was to heat the water to a certain temperature. This was done by a steam pipe that went down into the water. As to then what was done, that is pretty near as far as I can go. I do not know then whether they put the solvent in the first or put the glue, but I think they put the glue in before they put the solvent in, but I would not be positive about it. They had a chute made up over the tanks and the glue was weighed out and then dumped into the tanks through that chute. They had a tank separate to use the solvent in, made the solution of the water and the solvent and they had a pipe that run it into the tank from the solvent tank.

The condition of the weather would not affect the action of the glue in any way, so long as it was kept in the dry. If the weather was very cold the glue would not act the same as when the weather was very hot. It seemed to be stiffer and more clumsier in the cold than when in the warm, thinner when in summer. I think we would get as good results on a cold winter day as on a hot summer day, that is, [fol. 647] as far as to the sticking qualities. The glue would stick as well on a cold day as on a hot day, but would be stiffer and harder to apply. The action of the glue would differ when applied to dry wood from its action when applied to wet wood or green wood. As to the difference, I do not think it would stick on the wet green wood. As to what kind of wood we folks used in making this veneered heading, well, I have used several kinds. We used gum, black gum. We have made some heading out of sassafras and some out of birch and a little sycamore, about all I can mention, I believe. As to how did the results with respect to use on gum compare with the results as applied to sycamore, I think it was better on the gum. I do not think it would give very good results on sycamore.

Recross-examination:

I do not know anything about the various formulas that were used or the amounts of materials that we were using in mixing Perkins glue.

## Deposition of Lem Baker, a Witness Produced on Behalf of the Defendants March 27, 1914

I am a letter carrier. I was connected with the Poplar Bluff plant of the Brooklyn Cooperage Company. I met Mr. F. G. Perkins there. When I first met Mr. Perkins I was working in the glue room as assistant foreman. Mr. Perkins was there experimenting with some glue he had; trying to get the people to buy his glue. That is as far as I know what he was there for. As to how Mr. Perkins conducted these experiments, well, he first mixed his glue in the iron pots, we called them at that time, for the purpose of experimenting with the glue. These iron pots were the same that had been used before that time for mixing the casein glue in. I do not know what Mr. Perkins first put into the iron pot as I was not present during his first mixtures. At the earliest mixture that I know of, the first that he put in the pot was water. The best recollection that I have of it, he next placed the powdered form that he made the glue of. I do not know that I can tell the exact name of it. Then they used something they called a solvent, I believe, that he put in there. I do not remember how he prepared the solvent for mixing in the iron pots. To the best I can remember, the solvent was used afterwards in preparing the glue. As to how the solvent was prepared [fol. 648] afterwards, well, at the time I had anything to do with the mixtures, it was first put into water and dissolved into liquid form. When this solvent was put into the water, it heated the water, made it warmer. The water was made quite warm, the best I remember. As to how the solvent was added to the mixture of glue in water when the mixture was done in iron pots, I cannot remember as to the iron pots. But as to the general mixture in the tanks, the solvent was mixed in iron tanks with water and dissolved and let into the mixing tanks during the process of mixing the glue. Powdered glue was put into water in the mixing tanks and after that the dissolved solvent was added to the mixing tanks. After they built the wooden tanks this was the general practice. I cannot exactly remember when these wooden tanks were built, but they were either built in 1905, the latter part, or 1906. L. B. Walker Manufacturing Company prepared the material for the tanks

and, I believe, put them up; I am not certain. That was the same concern as the Walker-Garretson Manufacturing Company. It was known at that time as the Walker-Garretson Manufacturing Company.

As to how long was it after Mr. Perkins began his experiments that the Walker-Garretson Company built these wooden mixing tanks, I cannot answer that question because I do not know just how long it was, don't remember. My understanding was these wooden mixing tanks were built for mixing what we called at that time the Perkins glue. Before that we used a glue that they called casein glue. The casein glue was mixed in iron pots. As to how long they continued to use casein glue after Mr. Perkins commenced his experiments, I do not remember exactly how long, but my understanding is, to the best of my knowledge, the casein was used at different times for in the neighborhood of eighteen months, to the best of my knowledge. But they would not let the tanks or the pots be taken out for fear we would want to use them for some future time and that at different times for mixing the casein glue. The casein glue was used for making heading and boxing during the time that the Perkins glue was on hand.

Regarding the matter of the plant being equipped for handling casein glue for a long time after we began using Perkins glue regularly, well, my understanding was they might go on the casein glue at any time, if the Perkins glue was not satisfactory. As to how long the Poplar Bluff plant remained equipped to handle casein glue after the adoption of Perkins glue, the iron pots, or part of them, were in position at the time I quit the factory in 1907, Octo- [fol. 649] ber; but I don't know whether they were ever equipped for using or not. As to whether it would have been a simple matter or difficult matter to get the plant ready to use casein glue at the time that I left, well, it could have been done in a short while, as far as I can answer that question, I believe. My recollection is that sometime prior to my leaving in October of 1907 the casein pots or kettles had been disconnected from the spreader below, but I do not know exactly when they were disconnected. The Perkins glue was the only glue that was being used when I quit the plant, October, 1907. As to how soon it was after the wooden mixing tanks were installed

that we began using Perkins glue regularly, I do not remember the exact length of time, but for quite a while we mixed only small quantities in the tanks for trial. The trials were made by making a mixture of different kinds of glue, or different formulas, you might say, for the purpose of experimenting. These different mixtures of glue that were made in small quantities were used up in gluing heading stock. And the best I remember, when one batch, or different batches, was a failure in sticking quality, they were let out throught the sewer pipe, but only a small quantity, or a small mixture rather. As to how did we test the sticking quality of the glue that was mixed in these small quantities, well, I had nothing to do with the testing, although I seen it done by trying to tear the heading apart, and if it didn't stick well or give satisfaction to the superintendent, there was a different trial of glue made, or a different mixture made and tried there. These experiments were made before the installation of the wooden tanks. Also, they experimented with different mixtures after the tanks was built, the wooden tanks.

As to what these different mixtures consisted of, the glue was handled in bags at that time and the different formulas were made, as to the number on the bag, and I suppose the different number represented the different kinds of glue. The different numbered sacks were all mixed or put in the same hopper and let into the tank, or mixing tank, during the process of mixing. I believe it did happen at times that the resulting mixture was too thin. There was none of it that I remember was so thin but what it was used. It also happened that the mixture would be too thick. As to what was done with such mixture, I remember at times when some tanks were too thick, they were thinned with the addition of water. Also, in letting a tank of thinner glue in with a tank of thicker glue.

[fol. 650] As to letters on the bags of Perkins glue, I believe that the only letters that I remember was those that were marked "Gum." I do not remember whether there was any more letters on them or not. As to the letters L and H on the sacks, I believe I do remember. That calls to my mind, I believe, some of them were lettered that way. I suppose they indicate a light and heavy body. Notice was taken of these marks for light and heavy in mixing of

the glue. If we had a mixture that was too light, the next mixture would be a heavier body, if it was found necessary to mix it so. To the best of my recollection, we used up all of our mixtures with the exception of small experimental batches that were turned into the sewer.

The Perkins glue was received in different quantities while I was there, in carload lots, also in lesser amounts. The barrel heading that was glued with this Perkins glue was shipped away in the regular course of business.

They had several different shut downs, or shut down at different times, at this Poplar Bluff plant. I understood the cause of the shut down was for repairs. I know there was quite a lot of repair work done at different times or different shut downs rather. I remember a time when the glue department was shut down while some other portion of the plant continued in operation. In one instance we were shut down in the glue department during the winter of 1905 and '06, to the best of my recollection. I do not know the exact reason for this shut down. I know we did lots of repair work during the shut down, but I do not know what was the reason.

The solvent was packed and delivered in wooden barrels. It was in crystal form or lumpy form. As to what it looked like, well, I don't know. I hardly know what it did look like; not hardly like salt; it was in larger crystals than salt is. In damp weather it would look like wet salt. It might have the appearance of resembling concentrated lye or something like that; although I don't know much about concentrated lye or the appearance of it. As to effect on the hands, it would make the hands burn or smart when it became dissolved on the hands by the moisture of the hands. The Poplar Bluff plant continued to use this solvent when I quit there in 1907, in October. As to when they began using it, it was used in the Perkins glue, or the first they used was in the mixture of the Perkins glue. I would not say that they began using this solvent when they first began using Perkins glue. I knew nothing about the first mixtures, but during the mixtures that I had anything to do with we used the solvent. During the entire period that I knew of the [fol. 651] solvent it continued to be the same. I never knew of any change in the solvent itself.

As to whether the men had any trouble with this solvent, in addition to that of its burning their hands, well, there

as no one that really handled the dry solvent except the nes that mixed the glue, outside of unloading it from the ar. During my time of mixing, I had no trouble in han- lling it as they fixed or made arrangements to handle he solvent so it would not be injurious to the one that as handling it.

As to whether I ever know of any of the solvent affect- ng the nostrils of any of the workmen, I would say no way, nly the dust from the solvent would make the nose burn n breathing it. After they found that the hands were urned from the use of the solvent, they used rubber gloves.

Referring to the glue department being shut down in he winter of 1905 and '06 and as to whether we were sing Perkins glue at the time of this shut down, I would ay the best that I could remember they were using it in n experimental way. If I knew the date when the wooden anks were installed at the Walker-Garretson Manufactur- ng Company, I could not say that that would enable me o fix the time when they began using Perkins glue regu- larly. They used the Perkins glue in a—or mixed the Perkins glue in the tanks after they were completed, in small quantities for some time, but I do not remember just when they began mixing the full capacity of the tank.

Cross-examination:

As to whether I remember that Mr. Perkins came out to the plant often and on a number of times nearly up to the time I left the plant in 1907, I would say yes, he made visits at different times up until something near that date. As to whether he came out on those visits to try and overcome troubles with the glue, I would say yes I think that was his purpose of visiting most of the time. As to Mr. Perkins using other chemicals at the plant besides the solvent, he used different kinds in mixing that I did not know anything about. I do not know what he used in mixing them.

Redirect examination:

Not knowing what Mr. Perkins used in those other mix- tures, then how do I know that he used other chemicals than the solvent, he used something else besides solvent, [fol. 652] as from my understanding it was necessary to

use something in the mixtures for the purpose of making the heading set, as we termed it. I saw him make his mixtures, but do not know what the entire mixture consisted of. I knew at the time what the mixtures were made of, at the time I had anything to do with the mixing. As to whether I ever saw Mr. Perkins make a mixture which contained something besides solvent and water, for treating the glue material, I think I did, yes. I do not remember what the other material looked like. I do not believe I can describe it in any way. I do not remember.

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DEPOSITION, TAKEN AT NEW YORK, OF CHARLES LANGLOTZ, A WITNESS PRODUCED ON BEHALF OF DEFENDANTS APRIL, 1, 1914

I am mechanical supintendent for the Brooklyn Cooperage Company, having been connected with them thirty-two years. In the years 1904, 1905, 1906, 1907, 1908, I was manager for the company at Poplar Bluff, Missouri; until June 1, 1906, the plant was known under the name of Lowell M. Palmer, and after that, R. M. Palmer, Agent for Brooklyn Cooperage Company. I had charge of the heading and timber operations and charge of the plant. The plant was making staves, headings and box shooks. The officers of the company at Poplar Bluff were Mr. Elijah Windsor, superintendent; Nelson Windsor, assistant superintendent. Mr. Elijah Windsor is now located in London, Canada; Mr. Nelson Windsor, at South Bend, Indiana; Mr. L. M. Palmer's office is here in New York.

I first met Mr. Frank G. Perkins at Poplar Bluff in connection with the introducing of the use of his glue. He entered into negotiations with Mr. Palmer here in New York and came to Poplar Bluff to have his glue tried out. I can not fix the date exactly when he came to Poplar Bluff, but probably 1905, to the best of my recollection. I do not recall at what time of the year it was. After he first came to Poplar Bluff he had some of his glue shipped there and instructed us how it was to be used; I do not recall the quantity of glue that he first brought there. He instructed in the use of his glue, Nelson Windsor and Frank Baker, who was in charge of the glue room.

hen he first came there I saw this work. As to his first
eration I have no very clear recollection of that, except
at the glue was dissolved in a certain quantity of water
d a solvent added, but I do not remember any propor-
ol. 653] tions. Frank Baker, if anyone, was subsequently
structed as to the proper proportions. This glue was in
wdered form, of yellowish col/or—light yellow. I be-
ve it came in sacks or bags. Before Mr. Perkins came
Poplar Bluff we used casein. The casein was treated
proximately as was the Cassava, except that the Cassava
as treated cold. Ammonia was the solvent used with
sein. The same solvent was not used with Cassava; we
ed caustic soda. I do not recall what proportion of
ustic soda and Cassava were used. I cannot recall any
the proportions. I only know that this glue material
as Cassava from what Mr. Perkins told me. He said
at Cassava was made from a tuber which grew in Florida
d was manufactured at St. Mary's or St. Mary's Lake,
lo not know which. He said it was the same root from
ich tapioca was manufactured.

After Mr. Perkins showed us how to use this glue we
gan to use it. As to what extent did we use it at that
ne, why, the entire number of heads were manufactured
th that particular glue, to the extent of the output of
e plant. I have no way of fixing any exact dates as to
en we began to use the Cassava glue for our output, ex-
pting I believe it was about 1905. I should say it was
thin six months of the time Mr. Perkins first came there.
As to in what quantities did we receive this glue ma-
rial in 1905, after we got fairly started it was received
carload lots. After we got started using this Perkins
ue I do not recollect of our using any other kind of glue.
I recall changes were made in the plant in connection
th the use of Perkins glue. The casein was prepared
melting it in a jacketed kettle of about ten gallons
pacity, and when we started to use the Perkins glue we
andoned those kettles and used a large wooden tank
th an agitator fitted inside to stir up the material; also
ade some changes in the glue spreaders. The wooden
nks were made by L. B. Walker & Company, of Poplar
uff. They were made immediately after it was decided
use his glue.

As to changes that were made in the spreader, the rolls on the old machine were covered with Brussells carpet and the new rolls were cast iron with grooves running parallel with the shaft on the surface of the roll.

As to how did we obtain the caustic potash which we used in our process, it was first shipped to us by Mr. Perkins; later on it was purchased from some St. Louis wholesale drug houses. One was Shields (I do not remember [fol. 654] the initials), and another was the Meyers Drug House. In order to get this solvent at as low a price as possible, I asked Mr. Perkins the correct name of the material which he heretofore had referred to as a "solvent." He later on gave it to me and we communicated with several concerns and got a price on this solvent. We continued using this caustic soda there until after I left Poplar Bluff. I do not recall we used any other chemical with the Perkins glue. The barrel heading that we made with Perkins glue was shipped to the various cooperages of the Brooklyn Cooperage Company and manufactured into sugar barrels. Then it was shipped out as our regular product.

During the time that I was out there at the Poplar Bluff plant, certain departments were shut down, but the plant, or some part of it, was running continuously. The gluing or veneering department was shut down. I cannot recall any date when it was shut down. It was shut down because over stocked with material and shortage on log supply.

Before we used casein the early experiments with veneered heads were made with a hide glue. We changed from hide glue to casein because the excessive cost of hide glue made its use prohibitive. As to the occasion of our adopting the Perkins glue over the casein glue, we were looking for a better glue at a lower price.

As to how does the Cassava glue compare with hide glue, as an adhesive it is inferior, but it is good enough for our purpose. Cassava glue is cheaper, so it makes it possible to use it for such an inferrior article as a barrel head.

I do not remember any date when Mr. Perkins gave us the correct name of the solvent. I should say six months after he came. He gave me the commercial name

and also the chemical name, or the chemical symbol, though I do not remember it at this time. I have no memorandum by which I can fix the time when we began using the Perkins glue regularly, excepting my letter books that are on file in the Poplar Bluff office, but I have nothing here. I conducted most of the correspondence of the Poplar Bluff office prior to August, 1906, but not all. Both myself and Mr. Windsor corresponded with Mr. Perkins.

Cross-examination:

I remember that after Mr. Perkins first came to Poplar Bluff that he came there at various times during the next two or three years. I remember that he came there at [fol. 655] these various times because Mr. Baker was having trouble in using his glue.

I remember that this Perkins glue was shipped there in different sacks or bags marked L and H. I understood that L meant light bodied and H heavy bodied glue. I think they were using this L and H glue up until the time I left. I remember that Mr. Baker had trouble at various times during the first two or three years because the glue sent by Mr. Perkins did not come uniform. My recollection is that although they might get one shipment to work fairly well, it would likely be that the next shipment would be different and would not work well, and Mr. Perkins would have to come out and get it going right.

I remember that a long time after Mr. Perkins started there the spreading machine was sent over to South Bend in order that Mr. Perkins might improve it so that we could use his glue better. I remember that there were some changes made with the gearing, a long time after Mr. Perkins started. I remember that at various times during the first year or two after Mr. Perkins started that he came there and experimented with different formulas, trying to make a better glue for us. I did not keep track of the various changes made by him, but I passed upon the result of his product. After Mr. Perkins started there in 1905 we kept quite a large quantity of casein on hand for some time. I believe this was because we were not sure that he would stick to Perkins glue, but might go back to using casein again. We kept this casein on hand there for about two years after Mr. Perkins started.

Regarding the veneer work which we did at Poplar Bluff being of an inferior class, I mean that it is quite different from the veneering used in furniture and cabinet work and almost any adhesive will give a strong enough joint for barrel heads, whereas such weak adhesive would be entirely impractical for veneering furniture or cabinet work. Almost any adhesive is good enough for barrel heads, provided it is cheap enough to use and will hold the plies together long enough until you get them into the barrels. I wish to add, in addition to that, it has to be somewhat water proof and remain intact until the barrel arrives at its destination. That is, any adhesive which is sufficiently water proof and will hold the heads together until they reach their destination is good enough for our purposes out there. We do not require any such strength of joint as is generally [fol. 656] obtained by the use of hide glue in cabinet or furniture work.

When I speak of cheapness of the glue, I base this upon its covering or spreading capacity, that is, the number of square feet that can be covered with a pound of glue. What we desired largely at Poplar Bluff was cheapness and accordingly we would dilute the glue with water as far as possible in order to get as large a covering capacity as possible.

Redirect examination:

At the time I was at Poplar Bluff there was no other cooperage plant there known as the Palmer Company.

As to what changes were made in our glue spreading machinery at the time it was shipped to South Bend, I remember several; I may not remember them all. I think a trough was applied to the upper side of the roll so that the veneer heads received a supply of glue from both sides, and the planing of a groove in the roll was another change that I remember. I do not remember any others at this time.

It was the decision of Lowell M. Palmer that we should use Perkins glue at the Poplar Bluff plant. I do not know what glue was used after I left the Poplar Bluff plant. Mr. Parker, the president of the company, and Mr. Barron, the manager, are the ones who would have had to determine whether or not to abandon Perkins glue and go back to using casein glue. If hide glue was as cheap as Cassava

glue, hide glue would be employed in making these barrel heads. As to what extent is Cassava water proof, it is very slightly so. As to what means I have of judging the relative holding power of Cassava glue and hide glue, this is only by observation in destroying the joint of the head. After the head was thoroughly dried, we pried it apart with an ax or a wedge and chisel and saw whether the adhesive was sufficient to tear the wood and, if so, we decided it was good, and if it was not, we decided it was poor. My experience is that hide glue is stronger than Cassava glue. I do not know how many times stronger.

Recross examination:

When I speak of the relative strength of Cassava glue and hide glue, I mean a Cassava glue that was used at Poplar Bluff while I was there.

[fol. 657] Redirect examination:

As to whether the glue which has been used since I left the Poplar Bluff plant is any stronger than what was used there, while I was there, I cannot answer, because I have not examined the heads close enough to answer that question.

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Deposition, Taken at New York, of Frank Shanley, a Witness Produced on Behalf of Defendants April 1, 1914

I am clerk for Brooklyn Cooperage Company and appear in response to a subpœna. I have with me the invoices, writings and telegrams named in the subpœna and produce them. The papers which I have produced are original papers coming from the regular files of the Brooklyn Cooperage Company.

(Copies of papers produced, offered as Defendants' Exhibit, Brooklyn Cooperage Invoices and Papers, Nos. 1 to 19, inclusive.)

TESTIMONY OF NELSON WINDSOR, A WITNESS CALLED ON BEHALF OF DEFENDANTS JANUARY 15, 1915

I am superintendent of the engineering and drafting department, Singer Manufacturing Company, South Bend. I have been with them almost eight years. I went with them, I believe, in 1907. Before going there I was employed at the Evansville Veneer Works, at Evansville, Indiana, about six months. Before I went to Evansville, Brooklyn Cooperage Company, Poplar Bluff. I was assistant superintendent there. The plant was known by a good many as the Palmer plant. I think I commenced there in June, 1899. Charles Langlotz was manager during 1905. Frank Baker was foreman of the glue department.

I did know Frank G. Perkins. He came to the Poplar Bluff plant at the request of L. M. Palmer to introduce his glue. I believe that was in the early part of 1905. I cannot state any more accurately from my memory. When he first came there to introduce his glue, he ran a series of tests, glued up veneered heading to demonstrate that his glue would hold the heading together well, that is, that it would make a good job of veneering the heading. I think the first of these tests, or rather, the first batches of glue that Mr. Perkins made up were made in a steam jacketed glue kettle which we had used for preparing casein, which was the ma- [fol. 658] terial we were using for glueing heading prior to Mr. Perkins bringing his glue. If I remember correctly, we installed a small mechanical agitator in one of these pots and I think Mr. Perkins made up quite a number of batches of glue before he succeeded in getting a batch that we could mix properly with this agitator and that would pass through our glue rolls and be applied properly to the heading. He finally succeeded in getting such a mixture, but he could not always duplicate the mixture.

As to the equipment that we had there for mixing up casein glue and applying it to these veneers, we had a series of steam heated glue kettles on a floor above the glue room proper. We mixed the casein in these glue kettles by the application with the casein of a certain proportion of water and of ammonia as a solvent. It was necessary that the casein be maintained at a certain temperature and we conducted the casein from these mixing kettles to the glue ma-

chines below through water jacketed pipes. The casein was then applied to the veneers by carpeted glue rolls. I believe the machines were made by A. S. Nichols Company of Boston. I am not quite sure.

As to the glue roll machines for applying the glue, the machine as a whole was made of cast iron. The bottom of the machine, what is usually termed the glue pot, the bottom glue pot, was of cast iron made hollow and heated by steam. The bottom roll, if I remember correctly, supplied the glue to the upper roll; in other words, there was no upper glue pot or glue receptacle.

The veneers that we glued up were about three-sixteenths inches in thickness, about twenty-one inches square. Three layers went to a barrel head. Only the center layer passed through the machine.

As to how long was it after Mr. Perkins began his experiments that he got this glue which would work on the machines, I think I have already stated that he succeeded in getting some of it at the start but that he had trouble in duplicating those batches. If my memory serves me right, that trouble continued for quite—well, the full length of my employment there. I could not say whether the first batch that he mixed was satisfactory to use.

He left there, I think it was in August, 1906. I had a little trouble securing those dates. I had no correspondence on it, and I am not real sure whether it was 1906 or 1907, and whether I met Mr. Perkins in 1905 or 1906. I was in charge of these experiments and reponsible to Mr. Palmer for these experiments. I think I conducted the cor-[fol. 659] respondence with Mr. Palmer. He was located at that time in New York City. I think the address was 184 Front Street. I did make a report on this process to him.

On being shown letter dated Poplar Bluff, Missouri, 2-21-05, addressed to Lowell M. Palmer, and signed Nelson Windsor, I remember writing the letter. It appears, then, that I was there in February, 1905. I stated in my testimony, I believe, that it was 1905 or 1906, Mr. Perkins came there. It must have been 1905.

As to whether there was any agreement entered into as the result of these experiments in regard to the use of this glue at Poplar Bluff, if there was I did not see it. As to

what followed these experiments, as to whether any changes were made in the machines or apparatus of the company to adapt them for the use of the new glue. I would say yes, changes were made. Suitable mixing tanks were installed more applicable for handling the Perkins glue than the mixing apparatus that had been used for the casein and the rolls of the glue machine were remodeled.

I cannot say in what quantities the first two or three batches of glue may have been received, but some time later the glue was received in carload lots. I cannot say definitely how much later. I would say within four months, but that is just from memory.

As long as I was connected with the plant no other glue than this Perkins glue was used there after Perkins started it in 1905. The barrel heads which were glued up by Perkins glue were put in with our regular stock and shipment made to various points that we shipped such headings. The glue had the appearance of coarse flour; sometimes quite coarse; sometimes rather fine; it varies somewhat in color. It was received in bags? I believe the bags weighed about two hundred pounds, that is, held about two hundred pounds of glue. I cannot recall exactly how these bags were marked, but it runs in my mind there were numbers on the bags, that is, numbers, I suppose, to identify the glue or the grade of the glue; and those numbers differed. As to letters on the bags, I cannot say whether that identification was in a number or in a letter. All the glue that we received, this glue material for making glue, was not alike. Some was fine; some was rather coarse; some was rather a white color; some running towards a cream color. We mixed the various varieties of glue. The purpose of mixing these different varieties of glue was to obtain a solution that we could use in our machine. We placed in the [fol. 660] tanks by measure a certain quantity of water and into the tank of water while the mechanical agitators were in motion, emptied the glue. After a thorough agitation we placed a certain amount of solvent. I believe the solvent was made up of a solution of caustic soda. This solution of caustic soda was run into the batch or into the solution in the tank slowly. The material was stirred during the addition of the caustic solution. I do not exactly recall the proportion of water which was used with refer-

ce to the amount of glue material. I believe it was about
o to one. We calculated the weight of the water through
size of the tank and placed a measuring stick in the
nk, so that we very nearly determined the water by
ight,—not positively.

As to the proportion of solvent with reference to the
ight of the starch, we varied that considerably at the
rt. I believe at the time I left we were using about six,
ll, between five and seven per cent about that. I can-
t say whether that was five or seven per cent of the dry
ustic soda in relation to the weight of the flour or whether
t was five or seven per cent of the weight of the caustic
da in solution in relation to the solution of the glue. I
annot say definitely whether that five or seven per cent
s taken with reference to the starch or with reference
the water in which the starch was put. I cannot say
ether that five or seven per cent was with reference to
water in which the solvent was first placed before add-
g it to the starch. I learned of the character of the glue
aterial which we were using from Mr. Frank Perkins
en he came to Poplar Bluff, which was along in the early
rt of 1905. As to the character of the solvent that was
ng used, this caustic soda, I knew that, I would say, not
er than the middle of 1905. I cannot recall whether Mr.
rkins used that soda solvent in the first batches that he
de or not. There was quite an effort made to dissolve
glue by heat and that was especially done in the first
all batches made with the glue kettles in which we had
ed the casein. I can not say whether in those experi-
nts with heat any caustic soda was used.

What I referred to as coming in in carload lots was
rkins glue. The Perkins glue did come in in dry matter.
far as I have learned since, it was a cassava flour. The
sein was what we used prior to the adoption of Perkins
ue. That had come in carloads and it is a product of
lk, by-product.

I did not know from the first that this material that
rkins was using was cassava starch. I do not recall when
irst knew that it was cassava starch.

ol. 661] The letter dated 22nd of February, 1905, re-
shes my recollection in this respect. I knew at this time
yway because that was stated in the letter.

In the letter dated 3/24/05, which is one of my letters, I stated that the second car had arrived on the 22nd instant. Therefore, we must have received a car prior to that.

As to when we began running the Perkins glue exclusively, I refer to letter dated 4/29/05, we must have started, as I state in this letter:

"We have been running Perkins glue exclusively now for one week, and I think I am safe in saying we will experience no further serious trouble in handling this glue as mixed for sugar or slack barrel heads."

When we commenced the purchase of caustic soda ourselves I think it was gotten from St. Louis. I cannot recall the name of the firm. I do not recall about when we began purchasing this for ourselves, but the records there show. The letter dated 5/12/05, addressed to William Schield Manufacturing Company, refreshes my recollection in this respect, as to the time when we commenced purchasing the caustic soda and from whom we purchased it.

Q. What were the changes in the process of making the glue to which you have referred in your testimony?

A. Do you mean the changes in the process of mixing the Perkins glue?

Q. Yes, after it was adopted as the regular glue for the plant.

A. In receiving the glue in carload lots, and the glue identified by number or letter as I have mentioned heretofore, we worked on the supposition that glue of the same identification mark would work approximately the same, that it should mix the same. We found in a great many cases—well, I won't say a great many cases. We found in some cases that this did not follow and that glue made up or mixed by the same proportions and with the same glue according to identification mark did not give the same result, and this result was especially marked in the viscosity of the glue, you might term the viscosity. Some of it would be very heavy and we would hardly be able to pass it through our glue roll and succeed in putting it on the heading properly. Another batch would be rather thin, resulting in hardly enough spread on our heading. In some cases where we received a carload after we had mixed the first

[fol. 662] batch, we had to experiment with it. Mr. Perkins did that while he was there also. He would use the same grade with it and then by his experimenting he would determine about how to mix it, and likewise after, while he was away from there, we did the same. Then we would use up the remainder of the car. The car itself seemed to run rather uniform.

Q. That is to say, if the glue was running too heavy you would mix a lighter starch with it, starch glue with it, and if it was running too light you would mix a heavier body of starch with it, is that correct?

A. What do you mean by a lighter body or a heavy body starch, that body determined after it was mixed?

Q. Yes.

A. Yes.

Q. So that these changes and experiments were simply in the proportions and the different grades of starch used?

A. Yes.

Q. Will you state, briefly, what, if any, changes in the machine and apparatus employed were made, the machine for applying the glue to the veneer?

A. We abandoned the carpeted, jacketed or covered roll and substituted a fluted roll, the flutes running with the axis of the roll.

I do recall someone visiting our plant at Poplar Bluff in order to inspect this process of applying Perkins glue. I think the superintendent of the Singer Manufacturing Company plant, at Cairo, Illinois, and I believe one of its foremen. I do not recall when this was that they came to Poplar Bluff to inspect the plant. Letter dated 4 29 05, addressed to Mr. Whitney, superintendent of the Singer Company plant, Cairo, refreshes my recollection in this respect. The letter does not state. I believe it was in the near future. I could not say surely. The letter states:

"We will be pleased to show you at any time whatever in this line may be of service to you."

I believe it was within six months of that time that Mr. Whitney came to the Poplar Bluff plant. I cannot say whether surely Mr. Perkins was there at the time, but I believe not. I think I showed Mr. Whitney and his fore-

man the process myself. I do not recollect whether I explained to him the proportions, the materials we used. I do not recollect whether I told him that we used cassava glue, cassava starch.

As to shipping glue to the Singer Manufacturing Company at Cairo, I think I made such a shipment. As to [fol. 663] what it was and what the amount was, I do not recollect. I do not recall when it was. Letter dated 5/17/05, to F. G. Perkins refreshes my recollection as to the shipment of this glue stock. The letter states:

"I will comply with your request by making shipment of this tomorrow, being too late now to engage a drayman today."

The letter was dated 5 17 05. I would say that the glue was shipped on 5 18 05.

I do recall somebody else coming to the Palmer plant to inspect the process of using Perkins glue. One gentleman's name was Talge, Charles Talge. The other gentleman's name was, I believe, Callahan. I believe they were connected with the Frost Veneer Company, Frost Veneer Works. I showed them the operation of applying this Perkins glue to the veneer and explained the process to them. I cannot say whether I told them the materials which were employed. I explained the process as fully as I knew at that time.

I am not sure that there were any other people came to inspect the glue process at the Palmer plant.

Referring to Windsor letter dated 6 19 05, and Mr. Newman of the Wilts Veneering Company, to whom that letter was addressed, I am not sure that he ever came to the Poplar Bluff plant.

Referring to Windsor letter dated 5 7 06, to Waynesville Wood Manufacturing Company, and whether a representative of that company ever came to Poplar Bluff to inspect the plant, this letter is apparently in reply to an inquiry from the Waynesville Wood Manufacturing Company. It does not state anything about any representative of theirs coming to Poplar Bluff, and I have no recollection of any representative coming there. I have no distinct recollection whether Mr. Newman or other- came to the Poplar Bluff plant. I have an impression in my mind that

there was another party came to Poplar Bluff besides the two mentioned, but who it was and when they came I could not give information.

Referring to letter 65, dated 11 8 05, addressed to F. G. Perkins, Plymouth, North Carolina, I do not know anything about his efforts to introduce the use of his glue at Plymouth.

You ask: From the time Perkins glue was adopted exclusively in April, 1905, until I left the Poplar Bluff plant in August, 1906, did they continue using Perkins glue exclusively in their regular business as I have described? I believe so.

[fol. 664] The output of the Poplar Bluff plant in barrel heads, say of glued, veneered barrel heads treated by the Perkins process from, say May, 1905, until August of the same year, was between fifteen and sixteen thousand pairs of heads, or enough heads to make about fifteen thousand barrels. These heads were all shipped out just in the regular course of business for making barrels. We made no difference between that stock and any other stock we had previously made.

So far as I know, we bought all of the starch glue material from Perkins? It was purchased through the New York purchasing department. I believe the glue was all paid for. That was done through the New York office.

As to whether they used Perkins glue at the veneer plant at Evansville, where I worked after leaving Poplar Bluff, it was not a veneer panel business. They used no glue. They manufactured veneers, but they did not glue up panels.

I am not familiar with the glue department of the Singer Company. I believe they used Perkins glue there. They also used animal glue. As to the difference in their use of the Perkins glue and animal glue, the classes of work for which they are respectively employed, broadly speaking, the animal glue is used for joint purposes, the Perkins glue for veneering purposes. As to why they do not use the Perkins glue for joint purposes, the probable reason, I believe, is that the Perkins glue is difficult to apply for a joint. The animal glue is more suitable for that purpose. Furthermore, with the animal glue, the cost item being forgoten, you can secure a better joint. The animal glue is

not necessarily more expensive than Perkins glue. The higher grades of animal glue are much more expensive than Perkins glue.

Cross-examination:

Referring to my letter No. 73, dated 5/7/06, where I say:

"For the class of work we are doing, I obtain a sufficient adhesive result in covering"—etc.,

I mean to indicate by that that the class of work done at Poplar Bluff was quite a different class of work from that done in the regular furniture veneering plants.

As to whether the wood used in making up these barrel heads is very rough, unfinished, as compared with the woods used in regular furniture veneering factories, I would not say very much heavier; it was some heavier.

In the letter dated 5/7/06, I say:

[fol. 665] "We have never used hide glue extensively in our work, but in the tests made forty to forty-five square feet with a nine cent glue was about the best result we could obtain."

As to whether when we tried this animal glue we mixed it in such proportions of water as to cover as many square feet as possible, and in doing so we had a glue so weak that it would not be sufficient for high grade furniture veneer work, I would say to that, that not requiring the same strength of joint in a barrel head that you would in a furniture business, we did not attempt to get as strong a joint and accordingly we used the glue at a weaker solution, used much more water.

It is true that after Mr. Perkins had come to the plant at Poplar Bluff and stayed there for some time that he kept returning at various times while I was there, to overcome troubles. I believe this was kept up until the time I left the plant.

It is true that we kept on hand a considerable quantity of casein after we had started using Perkins' adhesive. It is true that we kept this considerable quantity of casein on hand so that we might have it ready in case we had to abandon Mr. Perkins' adhesive altogether.

As to whether I was not mistaken when I mentioned the proportions of water to Perkins' dry adhesive base used

at Poplar Bluff, as to whether it was not four parts of water to one of dry base that was used there, at least in most cases, I believe I stated in my testimony that I thought it was two to one. That is a long time ago and I kept no record of the proportions and I could not state definitely whether there were two to one, or whether it was mixed two to one or four to one. I would say it might have been four to one.

As to whether or not in veneering done at the Singer plant the Perkins glue gives just as strong a joint as the animal glue which they had been using, for the work that we used the Perkins glue on I believe we got as strong a joint with the Perkins glue as we did with the hide glue.

When I spoke of joint work on which animal glue is used, I did not necessarily mean butt joint work, but jointing, as I understand it, in the furniture business is where you are glueing one heavy piece of wood, such as joining pieces of stock together, to make one wide board in which the edges of the stock—or in which you apply the glue to the edges of the stock. In almost all cases the glue is applied to these edges with a brush as distinguished from being applied [fol. 666] thereto with the usual glue roll. The reason for not using the Perkins glue on this joint work is, as I believe I stated in my testimony, on account of the difficulty of application. It is true that in the making of these barrel heads it is not necessary to have such a strong joint or such a permanent joint, because the heads are put into barrels and after they are in the barrel the barrel helps to keep them together. As to whether it would not make much difference as long as the heads held together for a sufficient time to get them into the barrels, I would say not entirely so. Barrel heads, of course, do not need to be held together with any such strength as regular furniture.

I did not know in 1905 or 1906, and never have known, how Mr. Perkins made this dry adhesive base which he shipped to Poplar Bluff.

Redirect examination:

As to what became of this casein which was kept on hand, I could not say. I believe it was on hand when I left the plant. As to why I thought there was any danger of our having to abandon the Perkins glue, I believe the rea-

son for holding the casein on hand could be stated that in any business you would hardly feel justified in abandoning your old process and abandoning all means of going back to it; in adopting a new process you would feel, a person who was conducting a business properly would feel that you ought to have some means of carrying on your business in case the new process fell through from the quality of the material or from the standpoint of the concern manufacturing it being able to supply it. As to what difficulty there would have been to have re-adapted our plant for using the casein, I believe that is stated in my letter to Mr. Palmer on the report regarding the Perkins glue. I think, if I remmber the letter correctly as I read it a few minutes ago, it said that about an hour's time would suffice to change from the one to the other. In other words, we kept all the apparatus for handling the casein glue intact. As far as I know, we did not go back to it at all. This was a mere cautionary method, keeping this casein.

As to what, if any, changes Mr. Perkins made when he came back to the Poplar Bluff plant after we were running the Perkins glue as a regular process, I cannot recall exactly, but it seems to me the changes were along the line of directing us how to overcome the difficulties that I spoke of previously; that is, the difficulties in securing the proper viscosity with the glue, or rather with the material that was sent us to make the glue out of.

[fol. 667] As to whether he made any changes in the machine or apparatus, I think we started out with what we found afterwards to be a rather light mixing apparatus; that is, it was rather weak, and we found, or rather he found, that a heavier mixing apparatus would enable us to mix the glue to better advantage. I believe that was to enable a heavier bodied glue. I am not sure on that, but I believe we took out the mixing apparatus that we had in our wooden tanks and renewed it with a much heavier apparatus. As to whether we made any changes in the glue applying machinery, I think the fluting of the rolls was changed several times. The purpose of these changes was to give the proper spread on the veneers with the different mixtures that it was found advisable to resort to from time to time. I do not believe we ever had to dispose of any substantial quantity of the glue which we

had mixed up, without using it. I do not believe we ever had to waste it.

Recross-examination:

As to whether some of these changes in the machinery either in the spreading machinery or the mixing machinery, were made as late as well into 1906, I could not say on that point.

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Testimony in Solva Case of Julius B. B. Stryker, a Witness Produced on Behalf of Plaintiff January 13, 1915

I am vice-president and general manager of the Perkins Glue Company; have held that position about five years. The business of the plant of the Perkins Glue Company is manufacturing and selling Perkins veneer glue, almost always known to the trade as Perkins glue.

I produce trade publications having therein articles on Perkins glue or vegetable glue.

(Trade publications produced by witness marked "Plaintiff's Exhibits 3 to 9, inclusive.")

In testing our finished product (glue base) the viscosity or strength is not relied upon alone, but each batch is tested by dissolving it under the method of the second step of the process as it is called, and the result of this dissolving forms the liquid Perkins glue, either with or without the use of heat, and this finished glue is then applied to blocks of wood, allowed to dry and set properly, and these blocks are then tested on a special testing machine for the actual breaking strength, and in many cases the liquid glue is [fol. 668] applied to veneers for further tests of its strength and quality, and in cases where there is any doubt the liquid glue is applied with the large glue spreader and actual veneered panels or tops are built up.

In making these tests of the finished goods then are also noted the general characteristics of the glue after dissolving, such as spreadibility, flow, color, etc.

We have in times past used what we knew as the acid process. As to the details of that, the mechanical han-

dling of the batch was quite similar in both instances. The starch liquor had added to it acid, sometimes hydrochloric, usually sulphuric acid, up to about two per cent of the total weight of raw material employed, and the starch liquor is heated for from four to six hours at a temperature of about 130 degrees Fahrenheit. In using this process it has found that more frequent testing was necessary on account of the process going too far or the chemicals and the heat acting too rapidly, and the method of making these tests was about the same as in the case of the alkaline process. When the body of the starch is reduced to the desired point, the batch is neutralized with a solution of caustic soda, and dried in a similar manner to that which I have described in connection with the use of the alkaline process.

The acid process which I have outlined above was the one which I believe Mr. Perkins considered to be the best for the purpose of making a wood or veneer glue. However, it is only one of a number of similar processes which Mr. Perkins had worked with and tried out.

The second process, that is, the treatment that is accorded to this Perkins glue base in order to make up a glue both in the plaintiff's factory for demonstration or testing and also by our customers under our instructions, in order to prepare the glue base described above and as carried out today in our customers' factories or in tests made in our own factory, a glue mixing kettle and glue spreading machine are employed. For the purpose of preparing the glue a suitable quantity of the base is weighed out carefully and it is poured into a glue kettle into which water has previously been put. The water in all cases is either carefully weighed or measured out, and about two and one-eighth parts of water are usually used today to one part of the dry glue base. This mixture is agitated, preferably fifteen or twenty minutes.

After the glue base and the water have been agitated, as described above, the solvent, which is sometimes caustic soda, is slowly and gradually added to the mixture. This should be done very gradually for the reason that a [fol. 669] thorough mixture is very desirable. Sometimes seven per cent, or thereabouts, of caustic soda is used as solvent, and no heat is applied. In other cases, less than

seven per cent of the solvent is employed, and in such cases the smaller quantity of solvent is assisted in its work of conversion or bringing the batch across by the addition of heat.

In the case of a hot mixture, as the use of the heat is usually termed, considerable care must be taken that the temperature is not run too high nor applied too long. In the case where no heat is used, the resultant glue is transparent, and in the case of a hot mixture the resultant glue shows, while still approximately transparent, a brownish or straw-colored tinge in it.

After the batch has come across under the action of the chemical, the agitation or stirring should then be continued, preferably not less than thirty minutes, and in most cases this is done, although I have known of shorter periods being employed, but is it not desirable.

After the glue has been prepared after either of the methods I have described, it is discharged from the glue mixer through an iron pipe, usually four inches in diameter where this pipe is attached to the mixer, and two inches in diameter at the discharge end where it empties into the glue spreader. Proper valves are provided in this discharge pipe so that the required amount of glue can be let down into the spreader as it is needed. The glue spreader has two rolls which pick up the glue and transfer it on to the wood surface which is to be glued up. One glue roll is situated above the other, and they are provided with grooves which pick up the glue in proper quantities and assist in the application on to the wooden surface. The spreader is also provided with scrapers which work more or less automatically, and the object of these scrapers is to remove any surplus glue from the roll before the glue comes in contact with the surface to be glued up. Each roll is also provided with a glue box which contains glue enough for a run of approximately half an hour in most cases, without being replenished from the glue mixer above. The veneers or core stock to be glued up are one or the other, run through the spreading machine, and while passing between the rolls the latter transfer the glue on to the two surfaces of the piece being run through. After the glue has been applied in this manner, the veneer or core stock,

as the case may be, is laid on top of another piece of veneer or core stock which has previously been laid out on the table or bench.

[fol. 670] In the case of three-ply panels or tops, one dry veneer will be placed on top of the core stock previously run through the machine, and another piece of dry veneer would immediately be placed on the bottom, and another piece of core stock run through the machine and placed between other pieces of dry veneer, and this operation would continue until a bale or retainer full, as it is commonly called in the woodworking plants, has been built up.

In the case of five-ply veneer, the portion of veneer next adjoining the center or core stock is usually run through the machine, and this would ordinarily be laid upon a piece of dry veneer, and the center or core stock placed on this and then a fourth piece glued and applied on this, after which another piece of dry veneer would be placed on top of it, and the operator would continue by this method until his bale or retainer has been completed.

The building up or laying up of these retainers or bales is preferably done in as short a time as reasonably can be employed, as it is not desirable to allow the surface of the glue to become set prior to the surfaces of the wood coming in contact with the glue on the panel. These bales, as soon as they are completed, are removed and placed in a hydraulic or screw press, as the case may be, where they are subjected to a pressure of approximately one hundred pounds to the square inch. This pressure is applied long enough so that all the glued surfaces may come into near perfect contact as is possible, and while this is taking place bolts or retainer rods are placed upon the bale in such a way that they retain the pressure in the bale as soon as the pressure is released on the press itself. These bales are then set to one side, usually over the following night, to allow the glue to set. After the set has taken place, the retainer bolts are slacked off and the pressure removed, and the panels or tops are thereupon removed to other portions of the factory, sometimes being placed on thin strips of wood to assist in drying out, and sometimes being put through a re-drier or into a room containing a low temperature which is for the purpose of drying out any moisture which may remain in the veneer.

(Witness produces photographs of the kettle and spreader, marked "Plaintiff's Exhibits 10, 11 and 12.")

In this process of reducing the Cassava during the first stage all the raw material which is orginally put into the process remains there. There is nothing dissolved in the [fol. 671] first process. Whatever has been dissolved in the water used in the first process is carried out in that water, carried away in that water.

None of the articles relating to glue in the trade journals produced by me above were inspired by me or our company in any way.

Cross-examination:

As to the effect of continuing the treatment in the first step, the treatment with peroxid, after the conversion or degeneration had progressed far enough for our purposes, I would say I am no chemist and I do not pretend to be able to answer your question. The point that I have always had to look out for in manufacturing the glue was not to carry it too far, and I am not prepared to say myself whether it is a correct chemical theory or not, not being a chemist. But our theory in manufacturing has been that the amount of chemical which you speak of and which we use is, upon becoming exhausted, not sufficient to carry the product materially beyond the point that we want it to go, and as to what would happen if much larger quantities or sufficiently larger quantities were used, I am not prepared to say. I have, however, carried the treatment further than was found advantageous on some occasions. The character of the product we made in a case of that kind would be, if carried far enough, entirely lacking in characteristics of a good wood glue. By that I mean that there would be great trouble in getting it to flow preperly, it would be short and pasty and lardy. It would not go through the pipes as would be required of it, and its native glue qualities would seem to be more or less completely destroyed.

If we carried the process too long in point of time, using the correct amount of chemicals, if the proper amount of chemicals were used at the outset, there would be no effect by carrying it a longer time. The chemical used would seem to exhaust itself within an approximate given

time, and you could stir that batch for a week if you wanted to and there would be no appreciable difference.

As to which of these processes of treatment we used first, the acid process or the peroxid treatment, according to my recollection, the goods that were first tried out for use in wood glueing were made by the acid process, similar to the process which I have described. According to my recollection, it differed from that process as to the amount of acids used and the length of time the acids were employed, the degree of heat, the time that the heat was applied and [fol. 672] stopped, and different combinations of acid were tried out, a great many. I say a great many, I remember a few different acids that were tried out from time to time.

We have used this acid process, a similar acid process, for making other materials than wood glue from starch; we made a sizing for wood by a similar process to the one I have mentioned, and then some time prior to that, in fact, several years prior to that, we used an acid process somewhat similar for manufacturing sizings for cotton goods, rope, yarn and things of that nature.

The purpose of this sizing for wood was to fill up the pores of panels or tops used after they had been glued up, so that in the finished job—in finishing the top of the panel with varnish and oils and things of that kind that the finish would stand out and show up well instead of sinking down into the pores of the wood.

I believe we used a treatment of peroxid and caustic for attempting to make a laundry starch, but it was not a success. We abandoned—the Perkins Company abandoned that and we did not follow it up after that.

Redirect examination:

When I said it made no difference in carrying out the preliminary treatment, if we used the proper amount of chemical, it would not make any difference if it was carried too far in point of time, that is, if it was carried longer in point of time than the necessary amount of time which we usually employed, I referred to the alkali process alone. That is not true, of course, of the acid. In respect to the acid process, to make a suitable wood glue, the acid process would have to be stopped at the exact time.

TESTIMONY TAKEN JANUARY 19, 1915, OF JULIUS B. B. STRYKER, RECALLED BY THE PLAINTIFF IN REBUTTAL

I was secretary and treasurer of the Planters Manufacturing Company, and superintendent of the factory of the company at Lake Mary, Florida, and since that organization of the Perkins Glue Company in 1910 I have been manager of the Lansdale, Pennsylvania, plant for one year or until 1911, since which time I have been vice-president and general manager of the Perkins Glue Company.

My work as superintendent in the Florida factory kept me in touch with the process carried out by Mr. Perkins in his factory from 1904 to 1910, say. I was in touch with [fol. 673] the work which Mr. Perkins was doing in connection with adhesives during this period. At times I visited the plants at Poplar Bluff, Missouri, and the Singer Company at South Bend, Indiana, where he was working or had been working with his adhesives. Mr. Perkins kept me generally informed of the work he was doing in connection with adhesives during this period. In 1904, 1905, 1906 and 1907, I was in personal charge of the carrying out of the process at the factory. In fact, I think I ran myself the larger number of the batches of different materials which we turned out during that period. In fact, I had considerably more to do with the processing of these goods at the factory than any other one person.

As to the different products which we turned out, I mean there was a very great many different treatments used. Attempt was made to keep these various treatments or processes which were carried out at the Florida factory secret. Everything was done which was possible to do to keep the process, when the work was being done, a secret; and with this end in view the work was divided up among the different men, of which there were not very many employed, with the idea that just as far as possible one man would know and do his own job and not know anything about the other man's job. And at nights and Sundays a watchman was kept on the premises at all times. A barbed wire fence was built around the factory and the only gate—or two gates, I believe there were—at any rate, all of the gates were padlocked at all times. And further than this, Mr. Perkins allowed or paid several of the more trusted men a bonus on a monthly basis.

Yes, all of the men employed in the plant were told a great many times that they were to talk to no one in regard to the work that was being done there, and in fact on several occasions we discharged men we thought were not living up to instructions.

This system of secrecy as kept up at Florida until the plant was moved North in 1909, or the early part of 1910.

Mr. Perkins did not ship any of his starch products or adhesives to Poplar Bluff, or the plant of the Brooklyn Cooperage Company at Poplar Bluff, Missouri, in 1906. I think the last shipment he made to them in the year 1905 was about August, 1905.

As to the business of Mr. Perkins and his company, the Planters Manufacturing Company, say during the year 1904, it was manufacturing cassava starch from roots which [fol. 674] grew in Florida, and also manufacturing from cassava starch or flour sizing for cotton goods, paper, carpet cops and cordage, and also making some paper box adhesive or paper finishing sizing, and in manufacturing laundry starch.

A large portion of the materials which Mr. Perkins shipped to Poplar Bluff in 1905 was material which had originally been made for some of the uses which I have just enumerated in my answer to the previous question, such as these sizings and things. Some so called raw starch was shipped there. Mr. Perkins shipped so called raw starch there for the purpose of mixing it in with different preparations to make a base to work with, and his idea at the time was that a certain mixture of the raw starch would strengthen the adhesiveness of these other materials which he shipped there. As to why Mr. Perkins did not mix it always in the same proportions, well, for one reason, Mr. Perkins didn't know what was required of an adhesive when he started in on the Poplar Bluff work. After he got some idea as to the requirements he found that were desirable he had to try and use different proportions of raw material with these sizing materials or materials which had been degenerated to a more or less degree, in order to get them to work at all, or so that they would flow out of a mixer, flow through a pipe, so that they could be spread at all with machinery. There were other difficulties Mr. Perkins encountered in this work at Poplar Bluff. In addition to hav-

ing to have an adhesive base to work with, which would give a sufficiently strong joint for the class of work done at Poplar Bluff, he found that he had to overcome some difficulties which he had not expected, apparently. For instance, the glue when converted had to be of such a body or viscosity that it would flow through the pipes from the mixers to the glue spreaders, and it had to be capable of application by a glue spreading machine. Oftentimes, the glue would be so thick that it would not flow through the pipe at all, and it would have to be thinned down. At other times the glue would be somewhat too thin, so that it would result in a weak joint, and after the glue was once properly applied to veneers it had to be capable of making a proper joint and of setting within a reasonable length of time. One trouble that was encountered in regard to the set was that the glue which he used contained water to the extent that it soaked into the wood, and I believe it soaked to the extent that the retainer bolts were broken. In fact, I saw some of these bolts, if I am not mistaken, in the plant. This was due to the large amount of water which [fol. 675] was contained in the mixture.

As to whether any difficulty was encountered in sending a uniform product to Poplar Bluff in 1905, or whether a uniform product was sent there, I would say there was not a uniform product shipped there in 1905, but quite the reverse of that. The material shipped there, as I mentioned before, consisted of numerous lots of material which had been made for the purposes I previously mentioned, and these were mostly—in fact, nearly all of them—were made by processes which differed in some respects. For instance, different chemicals were used on the different batches and different combinations and percentages of the same chemicals were made of different batches. Some processes were run with heat and some were run without heat, and the temperature used varied very greatly. The raw materials used in these batches were not the same. Some batches, as I remember it, were made of cassava starch, I think from the root grown in Florida, and sometimes the batches were made from imported cassava.

As to why Mr. Perkins did not use a single glue formula or process in making these starch bases, Mr. Perkins at that time was unable to make a uniform product for the rea-

son that he had not had sufficient experience. He did not know how to make a uniform product from different raw starches.

Comparing the adhesive that was made at Poplar Bluff in 1905 and 1906, from Mr. Perkins' product, with the Perkins glue we are making today, the material after conversion at the plant in Poplar Bluff was very materially weaker than the product that we are making today. No such strong adhesive or joint was required in the barrel head work at Poplar Bluff as is required in the glueing of regular furniture panels such as our customers use today.

Mr. Perkins tried his starch products for glueing regular furniture veneers in certain factories in 1906. He tried his products out and made experiments and tests at the plant of the Frost Veneer Seating Company, at Jersey City, New Jersey, and the plant of the Singer Manufacturing Company South Bend, Indiana. He made trials and tests at the Frost Veneer and Seating Company plant for quite some time, as I remember it, three or four weeks, and the result of this was that the Frost concern was not satisfied with the work turned out by Mr. Perkins' adhesive and he removed all his apparatus and material from that plant. [fol. 676] Mr. Perkins went to the plant of the Singer Company at South Bend, Indiana, in the summer of 1906. He did not then start right in using his glue at the Singer plant in South Bend. He found when he started in at the Singer plant that the class of work there was considerably different from anything that he had done up to that time, and he was working on the designs of some new glue equipment, and this equipment, as I remember it, was delayed in arriving at the Singer plant. He did, however, ship a machine, I believe, one spreader, from Waltham which he tried out at some time prior to the receipt of the machinery I have just referred to as being worked on and designed by him. He first got a fair start at this Singer Company in South Bend in the fall of 1906. As to the nature of the equipment he was designing, he was working at that time more particularly upon the glue spreader. This was simply a spreading machine for applying the glue to the work in the Singer plant, or, in fact, in any plant. I think he had to have special mixing tanks for this work at South Bend. I think that the original tanks started out

with in the South Bend plant were quite small tanks, and I know that they built some much larger tanks which, according to my recollection, were made in Chicago some place; I don't know where, and it was the delay in the receipt of these tanks which held up the work.

As to whether Mr. Perkins' glue worked out all right at the Singer plant, it was not until about a year after the fall of 1906 that it was permanently satisfactory and in such shape that Mr. Perkins felt he could leave the job.

The difficulties Mr. Perkins had consisted in getting a glue base which had the adhesive qualities required into such shape that it could be handled practically on the work there, and under factory conditions generally. Mr Perkins had made a great many laboratory tests, worked on the larger batches for other uses, but the work at the Singer plant was of such a nature that the products he had worked out up to that time were not satisfactory, and his method of converting them and getting them into liquid glue, getting them in such shape at the same time that they would flow properly, save trouble, would spread properly and set and dry properly,—and oftentimes Mr. Perkins during the first year with the Singer plant got batches of glue converted which would work all right during the day on which they were brought across or converted, but the next morning they would be thick and heavy and gobby, and would not flow [fol. 677] through pipes between the mixers and the spreader, they would not spread properly nor set properly. Some batches, on the other hand, would go too thin, and he found that it was necessary to try out several different methods of converting or bringing across the glue base, with varying percentages of solvent, and he tried out several chemicals which he attempted to mix in with the glue with the idea that it would make the glue set quickly.

I am talking about matters now which Mr. Perkins told me about and about which he wrote me a great many letters at the factory. During all this time at South Bend Mr. Perkins was working there, he wrote me at least an average of one letter a day, oftentimes two or three letters, and sent me a great many telegrams telling me what troubles he was experiencing in his work there, and asking me, on batches which he directed me to run in the factory for that work, to make certain changes, and in order to direct me in what

way to work on these changes, which direction to go, thicker or thinner, or in regard to the glue base used, he explained very fully to me in these letters all of the troubles that he was having. I was in the factory in Florida at that time. He was in the Singer plant at South Bend trying to use the goods and he was having these troubles with them. This was all what he wrote to me and told me and I made, I think—I know I made one and I think I made two trips to the South Bend plant. He had me go up there at least on one occasion to show me troubles that he was having, with the view that I could go back to the factory and possibly better it.

While Mr. Perkins was at the Singer plant in 1907, or until the fall of 1907, I was having more or less difficulty at the factory in Florida in making starch bases which Mr. Perkins directed me to make, in getting it uniform. The base of the raw material from which the different batches were started would vary more or less, and any variation in the raw material would mean a consequent variation to a slight degree in the process. Some of these goods were made on an acid process which was not as readily controlled as what we know as a double soda process, consisting in the use of peroxid soda and caustic soda, and we found that we had trouble at one time with our water supply and had to rectify that.

We had trouble by reason of the raw material being different. The variation in the raw material made necessary changes in the process, and if we did not succeed in getting this change of process right or to correspond, the net result or end point of the glue base would be somewhat different. The raw material which we were using at that time was of [fol. 678] a different grade or quality from what we soon learned we should use to make the best product, and much of that raw material had not the original strength or the native strength in it to make a good wood glue of the character required of it for that purpose, and if the strength is not in its originality it is impossible to bring it out by any means that I know of or ever heard of.

As to the number of different processes we used, why, in the first half of 1907, in preliminary treating the starch under Mr. Perkins's direction, I should say we used from two to three dozen.

As to the financial condition of Mr. Perkins and his company during the years 1905 and 1906, during this period the business of Mr. Perkins was very heavily in debt, and in fact Mr. Perkins drew out of the business barely enough money for his living expenses, and his salary was only drawn by him in part for several years. He put in all of his own money and all of the money which he could borrow. In fact, I myself for one period of six months drew no salary at all, and I advanced nine hundred dollars of my money into the business for pay rolls and local bills at Lake Mary, Florida.

The business was not making any money in 1905 and 1906. I think in 1907 was the first time that we were able to pay the interest as it accrued on the debt and, if I remember correctly, we slightly reduced the debt in 1907 and paid off more in subsequent years, and in 1911 the business paid a dividend of six per cent per annum, which it has paid from 1911 until the present time.

If Mr. Perkins's products were not all right for glueing barrel heads or doing the work at the Singer Company in 1905 and 1906, then as to why could not or did not Mr. Perkins test it out first in the laboratory instead of shipping it in such large quantities to those places, I would say Mr. Perkins made a great many laboratory tests with that end in view, but it was impossible to develop the process and make final tests that were required of the glue any place else excepting in a wood-working factory or plant where the actual conditions existed. For instance, in the laboratory test as compared to the actual requirements of the glue, the glue had to be of such a nature that it would set properly in large bales or bundles. Different sized panels were used, and they had to be of such a nature that it was fitted for all of the different woods that were used in any one wood working plant or for different classes of work carried on in any one woodworking plant, and it was impossible to tell [fol. 679] in the laboratory in small tests whether the joint which was made on a small veneer would stand the strain of being machined or planed within the time that would be given for it to set in the plant, and on small samples it would often show up a good joint but on a great many large panels set up in bales there would be moisture present

which could not get out of these retainers, and the result would be entirely different from what would be indicated in the laboratory test.

As to judging the flow and spread in the laboratory tests, there was no sure way at that time of testing the flow and spread as it would be carried out in actual practice in a plant. I might add to that, that it was impossible in any laboratory to reproduce the factory conditions in very many respects.

As to whether we find that the glue sometimes works somewhat differently in large batches than it does in small batches, that trouble has been found. So I would say we could not definitely tell from a small mixture whether or not we would get the same result with a large mixture. It was impossible to tell though from any ordinary laboratory batch just how that same goods would work out in the factory when made up in batches of from two hundred to a thousand pounds of dried glue base to the batch.

Regarding Mr. Perkins' products not being satisfactory in 1905, 1906 and 1907, at the Poplar Bluff plant and at the Singer Company plant in South Bend, as to how it was that these people would take such large quantities and pay him for them, well, in regard to the Poplar Bluff plant, Mr. Perkins obtained a letter of introduction from a friend of his, to Mr. L. M. Palmer, who was the manager of that plant at that time, and as a result of this letter Mr. Palmer agreed to allow Mr. Perkins to go to Poplar Bluff and test out his product, and some time after that Mr. Perkins was very badly in need of money to carry on the business and his work, and he told Mr. Palmer this fact, and Mr. Palmer agreed to allow him to ship to Poplar Bluff a very large supply. I was not present and did not hear the conversation. Mr. Perkins told me and Mr. Palmer told me. I know of my own knowledge that the business was in very urgent need of money to carry it on.

Mr. Palmer took large quantities from the company of this adhesive. As to whether he took more than was actually required at the Poplar Bluff plant, he took a supply sufficient to run him (based on the approximate amount of glue base used); an amount that was sufficient to run this [fol. 680] plant in the neighborhood of a year. I think

they used some of the glue in 1906 that had been shipped in 1905.

As to why the Singer Company took such large quantities in 1906, or whether such large quantities were necessary to satisfactorily test the material at the Singer Company plant, I can say that a large quantity was necessary to satisfactorily test the material.

In all of my experience I have never heard of any other glue, except animal glue and this vegetable glue, which would be suitable for glueing up furniture veneers. I am familiar with casein. Casein will not do this work.

Coming back to the shipments to Poplar Bluff in 1905, some of the starch products which were shipped there in 1905 had been at the time, or just previous to the shipment, mortgaged. It was a very large proportion of them, of these 1905 shipments, that had been mortgaged. They were mortgaged to their full value.

Cross-examination:

As to which were the processes employed by the Planters Company and Mr. Perkins in 1904 of treating starches to make sizing for the various purposes which I have mentioned, we used some different processes for different purposes. They were all processes for the degeneration or modification in some manner of starch, as I remember. For the various purposes we tried to degenerate to different degrees. As to the various processes which we used for this purpose, we tried it out, according to my recollection, I cannot remember all of the processes at this time—the use of sulphuric acid at varying amounts and hydrochloric acid with and without any heat. We tried varying percentages of the acids. We ran heat different lengths of time. We tried out the use of bleaching powder, sometimes alone, sometimes in combination with acids or alkalies, sometimes with heat, sometimes without heat. We used permanganate of potash to some extent, tried different combinations with that with other chemicals. Tried the use of peroxid of soda, caustic soda, with heat and without heat. There were Sundry other combinations which I cannot remember now.

As to the combination of peroxid of soda and caustic soda, according to my recollection, we did some work on

that in 1904. I cannot remember what the proportions were that we used. We sold the products of some of these treat- [fol. 681] ments in 1904. A great deal of it was experimental; some of it, I should say, was experimental.

As to our output in 1904 of sizing materials and things of that kind, it is pretty hard to say from memory. According to my recollection, possibly two hundred thousand pounds or less. As to our output of starch, I cannot remember what the output of starch was; probably about the same amount; possibly a little more or a little less. At that time we were using some starch of our own production and some that we bought. I cannot recall about what proportions we bought and what we produced.

As to what treatment we were subjecting starch to in the early part of 1905, which we shipped to Poplar Bluff, that portion of it that was treated at the Lake Mary factory was put through a number of different treatments, that is, different batches, I would say, were treated differently, but just exactly what treatments were used on those particular shipments, I cannot state from my memory. On some of the batches I should say sulphuric acid was used. I am quite sure that all the batches were not treated with sulphuric acid. As to those batches which were not treated with sulphuric acid, they were treated with hydrochloric acid; I believe in one instance nitric acid, but on the latter I am not positive. I would not want to state from my memory that all this material that was treated at all that we shipped to Poplar Bluff was treated either with sulphuric or hydrochloric or nitric acid. We kept a record of the treatment of the batches at that time. I have a good many records; I don't know whether I have a record of those batches, those particular batches, or not. We had not as complete a system at that time of showing where particular batches were sent as we have today, of course, but at the same time we have some records as to where particular batches were shipped. I have these records in the city here.

As I said in regard to shipments in 1905, at that time our records were not as complete as they are now, but I will endeavor to find the records covering all of the lots referred to as far as possible. They are sheets of paper about so long and so wide (indicating), and from one to

three or four sheets on some batches; each batch or lot of goods which was run in the factory. I made probably the most of these records myself at the time the goods were being run. They will show quite fully what the treatment was at the factory of those runs or whether, as in some cases, raw starch was shipped, they may show that. I am not sure whether they will or not.

[fol. 682] As to how the material shipped to Poplar Bluff, which was untreated starch, was marked, I do not remember positively how the material was marked. It was marked with some figure or number to distinguish it, but I do not remember the exact mark. It may have been H. We marked goods, I remember, H. We marked them L, and some that were marked HM. I expect probably the raw starch was marked H because HM was put in to denote that it was a heavy body glue which was modified, so that the H probably stood for the raw starch. At that time we were shipping raw starch, the raw starch slightly modified and a starch which was more modified. These starches were shipped in separate bags.

As to how the starch marked L differed from the raw starch, whereas the raw starch had been put through no treatment whatever, the goods marked L had been put through quite a severe treatment in order to reduce the body very considerably. As to how this treatment compared to the treatment to which we had been subjecting material designed for sizings and the like, if I remember, it was quite similar. In some cases I believe it was carried further and in others not so far, quite, as some of the sizing material was originally made.

Lots of goods which we made up at Lake Mary in 1905, that was carried further. That was done intentionally, except in the case where the treatment would get away from us and would go too far, and the material which was not carried quite so far, that was also intentional. The HM material was more slightly modified still.

Starches of these several kinds were shipped to Poplar Bluff, say, in the spring of 1905.

As to how often I was at Poplar Bluff in 1905 and 1906, I do not remember the date during 1905 and 1906 now, but I think I was there once in that time and either twice in those years or again in 1907. I cannot remember now

the dates. I believe I was not there during the first half of 1905. I may have been there during the second half of 1905. I do not recollect whether I was or not.

I recall that in March, 1905, the contract was closed with L. M. Palmer for the shipment and purchase of starch at the Poplar Bluff plant.

I have been in the plant of the Singer Sewing Machine Company at Cairo, Illinois.

Part of the goods shipped to Poplar Bluff during the early part of 1905, if I am not mistaken, some goods had been shipped there which had not been treated with acids of any kind, but which were still modified. I cannot re- [fol. 683] member now what was the treatment to which those goods had been subjected. It would, I think, be in these papers. I was going to say that I thought those records would show what that treatment was or is.

According to my recollection, there was not any of the glue which was shipped to the Poplar Bluff plant during 1905 marked Perkins Veneer Glue. As to an invoice dated January 13, 1905, in which it states "54 bags of Perkins Veneer Glue," well, that was simply a method of billing out the goods, a name used in billing and shipment out, but it does not follow at all that that or anything similar was stenciled or marked on the bag in any way. I do not remember that any goods was so marked on the bags.

The glue which was invoiced as Perkins veneer glue, as to whether this was both a raw and a treated material, I cannot remember as to that. A considerable portion of the glue which was shipped to Poplar Bluff was sago flour and a little goods made from corn starch. I believe the corn starch was treated with acid and heat. It was a similar degeneration product.

As to the solvent which was employed at Poplar Bluff for dissolving the glue material sent there, caustic soda was used as a solvent a large portion of the time, and Mr. Perkins tried out other solvents. He wrote and told me, but I do not know what they were.

When I was there in 1905 or 1906, at that time they were using approximately seven per cent of caustic soda, I believe. I cannot remember whether they were treating starch by first drawing water into a tank, then adding the starch and stirring it and then forming a solution of this

caustic soda and water and adding the solution to the suspension of the starch in the tank. In making tests at that time at the factory we would put a certain per cent of solvent consisting of caustic soda into the glue base that was suspended in the water, and sometimes we applied heat and boiled it and tested that way, and sometimes we brought the batch across with the action of a less per cent of solvent and heat, but not to the boiling point. I did not mean to say that we used less solvent when we treated it below the boiling point than we used when we treated it at the boiling point. At that time we did not make cold bursts. According to my recollection, we made no cold bursts—I guess we did, at that time, too, making the cold burst. In doing this we simply suspended the starch material and added a solvent until we brought it across. We tried varying proportions from, as I remember it, two to eight parts of water. Mr. Perkins did most of the test-[fol. 684] ing on that and I cannot say further with regard to that.

As to the shipment of starch materials during 1905 and prior to November, 1906, to other veneer or wood working plants besides the Poplar Bluff plant, some material was shipped to Plymouth, North Carolina, to the Wilts Veneer Company. During this period no other shipments were made to any other company or individuals, for this purpose, except those I have mentioned previously and goods shipped to Cairo, Illinois.

Referring to my testimony that we had difficulty in controlling the extent of treatment or degeneration to which the starch was subjected at our plant at Lake Mary in 1905 and 1906, prior to November, 1906, the over treated batches were used up by the addition of slightly larger proportion of raw material. The under treated batches were used up by the addition of material which had been rightly treated, or sometimes material which was treated too far. Oftentimes we mixed mixtures together in the factory which had been over treated and under treated. I believe we shipped to Poplar Bluff during 1905 approximately three hundred thousand pounds of material; that is simply from memory; it might have been more or less. I should say approximately one-third was under treated and

two-thirds treated in some manner or other. I cannot say as to what proportion of the treated was the light body or more completely treated starch. I could not give any idea whether it would run one-third or a quarter, because from my memory I cannot give that.

Referring to my testimony in regard to the Singer plant at South Bend, and that we got a "fair start in the fall of 1906," Mr. Perkins, if I remember it, actually got down to work there in September or October of 1906. I mean that he got a fair start in September or October in making these trials and tests.

At the present time the Perkins glue is all used in furniture. It is all used in furniture factories. I would say furniture and kindred classes of work, kindred uses, such as pianos, pianolas, sewing machines and things of that kind—all furniture, in a way. Strictly speaking, I suppose a door is not part of the furniture of a house. A great deal of our glue is used for door work.

As to our method of introducing our glue into a factory, we send a glue mixing kettle and glue spreader to our customer's factory, and also a man to start them in using Perkins glue. This man remains with the customer to show him about the use of Perkins glue, usually about ten [fol. 685] days, till he feels that they can mix the glue up; that they understand the necessity of keeping the equipment clean, weighing out their proportions properly and adjusting the spreading machine so that it is all right. We keep no one man to go to these factories again in case there is any trouble, but in case of trouble we do send somebody to the plants and in ninety-nine cases out of a hundred we find that the glue is the same as it always has been and perfectly all right, but there is some local trouble in the factory in regard to their stock or something of that kind. I mean the wood they are treating.

As to whether we ever have any trouble with the machines breaking down or not working properly, why, the machines break down, yes, the same as any machine will. As to the cause of the glue not working properly where the stock is at fault, the stock is sometimes too damp, wet. It is sometimes very badly buckled. As far as veneers go, sometimes a veneer is dried flat and straight and sometimes it is not; and on coarse stock, when that is glued up there are

times when coarse stock is of different thickness due to their planers will be thin on the edges or on one end, and if stock is not of about the same thickness all over they will have loose joints, loose edges.

The Lincoln Furniture Company in Philadephia were customers of ours for a year or two, up to within two years ago, probably. The last information I had they were now using glue that they had bought from the defendants. I believe it was during the summer or possibly in the fall that I had this information.

We did try to introduce our glue at Hood & Wright Company, at Big Rapids; we did not get the business. I believe we put in a machine and demonstrated the glue to them. I believe it was in 1909 or 1910. I am not positive. I do not know what the exact reason was why we did not get the business, any more than they did not want to go into it; did not want to take up the use of it. They thought it was not satisfactory for their use, I suppose. At the time prior to our coming in they were using hide glue, I believe, or animal glue. I do not know what glue they are using now. The purpose for which we tried to introduce our glue there was for veneers.

We did also try to introduce our glue at the Hobart M. Cable Piano Company and were not successful in so doing. We did introduce our machine and demonstrated the glue to them in 1910 or 1911, I should say. As to why our tests were not successful there, I had a letter from the Cable people saying that the glue was a success and, if I am not [fol. 686] mistaken, the number of pianos that they glued up and shipped out with our glue was fifty at that time. And they had, according to my knowledge, never had any complaint from those pianos at all. And the manager of the business told us that for other business reasons, which he did not want to explain to us, he would not go on and use Perkins glue in his factory. I do not know what the business reasons were. I do not know what they are using there now.

As to the Votey Organ and Piano Company, we shipped machinery there and made demonstrations. I think it was along about the same time. We did not get the business at that time. I do not know what their reason was. I do not know what kind of glue they are using now.

As to whether we make some form of contract to try the glue without expense to the customers, we have a similar contract to that, yes, and in the cases to which I have referred we probably made that kind of a contract. I know we did in some of them.

As to giving a rough idea of how many test sheets there are covering the processing done on the lots shipped in 1905, there would probably be fifty lots involved in the different shipments, so that I would expect somewhere around fifty or sixty sheets, if we can connect up the shipping records with the lot numbers. Those are the ones that I propose to look for and bring here. As to why is it that they are mixed up with other papers, well, as I stated in my testimony our system of keeping a record of the shipments in the different lots was not as complete by a great deal in those days as it is now, and I will have to locate, first, the lot numbers which went in these shipments. If it was just a question of picking out certain lot numbers, I could do that quickly. Now if you can give me the lot numbers I will pick them out for you in ten minutes.

Cross-examination resumed January 20, 1915:

(The papers referred to are handed to defendant's counsel.)

The treatment to which we subjected raw starch at our Florida plant did decrease its water absorptive properties in the sense that to render fluid a finished glue comparatively little water would have to be added.

At the present time we do keep a record of the processing of our material. The twenty-three hundred or more records, of which I spoke yesterday, include the records substantially down to the present time. As to what was done [fol. 687] with them 1905 and 1904, after we treated our processed starch to reduce its water absorptive properties, I do not know what all was done with it to produce various properties. I am not even sure I understand exactly what is meant by the water absorptive properties. As to whether the processes render it possible to get a more liquid glue without adding an undue quantity of water, why, it may have been sometimes, but I am no chemist on that.

A good dead of the starch which was shipped to Poplar Bluff in 1905 was processed in 1904. After we had

processed the starch some of it was shipped to customers as soon as it was made, but a great deal of the goods made was put in a warehouse, was put up as collateral for a loan and later shipped out to Poplar Bluff. Several different parties loaned Mr. Perkins the money on the goods. The names are Mr. George C. Clark and Barnett National Bank, Jacksonville; Mrs. H. D. Kendall, one of Mr. Perkins' aunts; and possibly others, I do not remember. Mr. Clark was not related to Mr. Perkins in any way, nor was anyone connected with the Jacksonville Bank I have mentioned. Some of these goods were covered in this way also by the First National Bank of Sanford, Florida, if I remember correctly.

We made a test of each run after it was completed. Just boiled it up to see what the body and viscosity of the goods was; referring now to the goods that were made in 1904. Those goods were boiled up to discover what the viscosity and the color was and the body. They were boiled up, certain proportions of treated starch in water and were put into what we call spot plates; and on laundry starch, as I remember it, we used the viscosimeter to get the viscosity of the goods. We used a viscosimeter which was similar to the viscosimeter which we use today. It was a rougher instrument, did not register probably the same by considerable. The laundry starch was supposed to be a thin boiling starch; that is what we tried to make. Sometimes it was thin boiling and sometimes it was not.

Q. I note among the records which you have produced that there are certain sheets marked "Process Record" and others "Test Department. Wet Test from Process." Under the heading "Method of Test" I note the letters DJ. What kind of a test was referred to by these letters?

A. A test is a double jacketed kettle heated by live steam. [fol. 688] Q. And on other of these test department sheets under "Method of Test" I find the letters LS. What do those letters signify?

A. If I could see that I could tell you, I think. (After looking at record) That referred to live steam. LS it is.

Q. That is what I tried to say. Under this test marked LS I notice the words "Ratio of test 9:1." What does this mean?

A. It means that nine parts of water were used to one part of starch.

Q. And the viscosity in the sheet dated 10/16/04 is given as 17-17. What does that mean?

A. That was the result of the test by the viscosimeter.

Q. And under "Condition when cold" I find the word "liquid." Does this condition when cold refer to the condition of the glue after it has been dissolved in this ratio of nine to one with live steam?

A. Yes.

Q. And "Condition cold after 72 hours" refers to the same material after it had been allowed to stand that length of time, does it?

A. It does.

Q. Have you any means of identifying the process to which the goods specified in Brooklyn Cooperage invoice No. 1, dated January 13, 1905, were subjected?

A. No, I have no means of identifying any lot with this invoice and the goods shipped under it. I notice on this invoice it calls for three barrels of No. 3 glue. That is something I never heard of, something that Mr. Perkins was using. I do not know what it was; nobody else knows. And the other goods was some of this starch degenerated material that we have been referring to, just which lots I have no way of determining.

Q. Please look at the other invoices dated up to August, 1905, inclusive, and state whether you have any means of identifying the treatment to which the starch referred to in those invoices was subjected, those invoices or any of them?

A. You mean all the invoices as a whole or——

Q. Just up to 1905.

A. I understand that, but you mean all these invoices as a whole or any one particular invoice?

Q. Particular invoices. I will ask you the other next time.

A. I find nothing on these invoices to connect them up with any particular lot.

[fol. 689] Q. What, if any, means have you for determining what lots were shipped to Poplar Bluff during the year 1905?

A. I have an original letter which I wrote Mr. Perkins, dated December 15, 1905, in which I gave him a list of the lots shipped up to that time. This list was taken from the records and memoranda which I had in my possession at that time.

Q. These are the lots shipped only to Poplar Bluff, are they? They do not include material which was shipped to other points?

A. Some of the portions, or I should say, portions of some of those lots on the list were shipped to customers for use as laundry starch or size of some kind; quite a few of them were.

Q. Then you are unable to determine from this letter, are you, which particular batches were shipped to Palmer and which were shipped to other customers?

A. No, that is not correct. All or a large portion of each batch, each lot number listed in that letter, was shipped to Poplar Bluff.

Q. I note in the opening of this letter you state:

"As near as I can make out the following numbers go to make up the last 250,000 lbs to Palmer."

Then in pencil I note: "Per old invoice book."

Mr. Macauley (continuing question): Per old invoice book we shipped L. M. P. about 320,000# from start to December 15, 1905. Who, if you know, put this notation on this letter?

A. I put it on. That is my writing.

Mr. Macauley: When was this put on do you recall?

A. No, I do not.

Q. From what source did you get the information contained in this letter?

A. From the records that I had in my possession at the time, and memoranda that I had in the plant.

Q. Do you refer to the records which you have brought into court this morning?

A. I understood your question to refer to those records, yes.

Q. Well, you were referring in your last answer to these records here?

A. I was.

Mr. Macauley: It is requested that this letter be copied in extenso in the record.

The letter referred to is in words and figures as follows, to wit:

[fol. 690] "Planters Manufacturing Company, Lake Mary

December 15, 1905.

"DEAR FRANK: As near as I can make out the following numbers to make up the last 250,000 lbs. to Palmer.

(In pencil:) ("Per. old invoice book we shipped L. M. P. about 320,000# from start to December 15, 1905.")

"#80—re-bagged G. T. A.

#75—re-sieved G. T. A.—H. C. L. Heat to 55 degrees, 1,196 Bi-carb, Na OH, $Na_2O_2$-V. 4:-25.

#74—Reg. cassava.

#72—Re-sv. G. T. A. B. P., $H_2SO_4$, Blue V. 9:1-15.

#71—Straight G. T. A. $Na_2O_2$, NaOH, V. 9:1-20.

#69—Reg. cassava.

#68—Resieved G. T. A. B. P. $H_2SO_4$, HCL, $Na_2O_2$, NaOH, V. 9:1-20.

#67—Regular cassava.

#67—7 Do. Regained.

#66—Re-sieved, G. T. A. HCL, $H_2SO_4$, Mg. Carb. V. 9:1-15.

#63—Re-sieved G. T. A. HCL, $H_2SO_4$, $K_2Mu_2O_8$, $H_2SO_4$, Mag. Carb. V. 9:1-5.

#58—Reg. Cassava. HCL, $H_2SO_4$, $K_2Mu_2O_8$, $Mg.SO_3H_2$-$SO_4$, V. 9:1-5.

#55-5 or #56. Re-sieved G. T. A. Carb. of Soda, HCL, $H_2SO_4$, V. 4:1-30.

#35-7. I sent you this record over a year ago.

#76—Re-sv. G. T. A. HCL. Bi-Carb. Heat 55 degrees C. 9-1-18.

#77-1 $Na_2O_2$. V. 9:1-103.

#25 CaOCL, $H_2O_2$, $K_2Mu_2O_8$, $H_2SO_4$, Ammonia, V. 10 oz: 1 gal. 21.

If there are any more lots you want the V. on and you will tell me the numbers I will give them to you.

(Signed) J. B. B. S."

Mr. Macauley: I note that in the opening paragraph you refer only to the last 250,000 lbs. sent to Palmer. Have you any way of identifying the process to which the first approximately 50,000 pounds were subjected?

A. I think you have all those records, right in that file there. I found last night reference in some carbon copies that I had to three other lots, or possibly four other lots, which you will find in that file there. Process records which are not enumerated on this list.

Q. And then they complete the 300,000 or so of pounds that you sent?

[fol. 691] A. That completes the 300,000 or 320,000 pounds. I think you will find three or possibly four records in that binder which are not listed here.

Q. Now I find in this letter on #80, "Re-bagged 1,198 G. T. A." To what does the number refer, and also what do you mean by "rebagged G. T. A.?"

A. That was cassava flour known as G. T. A., which was taken out of the original bags and put into others.

Q. And #80 refers to the record which you have here, does it?

A. #80 is the lot record, yes, referring to corresponding process record which you have in the binder there.

Q. And each of the numbers at the beginning of each of the lines of this letter refer, do they, to the lot numbers of the record sheets which you have brought in this morning?

A. The numerals on the first of each line refer in that way, yes.

Q. I notice opposite the numeral 75, "Re-sieved G. T. A. —HCL Heat to 55 degrees, Bi.carb. NaOH, $Na_2O_2$, V. 4:1-25." Will you please explain what these notations mean?

A. Those on lot number 75?

Q. Yes.

A. And you want to know what all the notations mean?

Q. Yes.

A. The "re-sieved G. T. A." according to my recollection, without referring to the record over there, means that flour used there was cassava flour known as G. T. A. brand, and it was re-sieved or passed over a sieving device for the purpose of getting the meal out of it. "HCL" stands for hydrochloric acid, and is mentioned to show that that acid

was used. "Heat 55 degrees" is to indicate the temperature.

Q. Just to indicate the temperature at which the process was carried out?

A. The temperature at which the process was carried out. "Bi. carb." means that bicarbonate of soda was added somewhere along the process. "NaOH" refers to caustic soda used in the process. "$Na_2O_2$" refers to peroxide of soda used in the process. "V. 4:1-25" means the viscosity at four to one (portions of starch and water) was a viscosity of 25. Now, I don't see what bearing that has got on the case however. That has got nothing to do with wood [fol. 692] glue, and was never expected to be used for wood glue or anything of the kind. You want to remember that all those records and all these things that you are talking about here are referring to sizes and stuff that was made for sizes of some kind or other, or laundry starch.

Q. But they were sent actually to the Palmer plant?

A. Yes.

Q. For use as wood glue?

A. Yes, after a year or so. They were sent there and used up in several dozen different ways, I guess.

Q. In the following line I find the words: "Reg. Cassava." What does that expression mean?

A. According to my recollection that meant that that was cassava starch made in Florida from roots grown there. Regular cassava starch, which had not been treated or modified in any way, unless it was a very slight amount of blue stone, or possibly in some cases a half pint of a weak solution of caustic soda, to make the fibers separate. It had nothing whatever to do with the treatment.

Q. Will you please read the next line and say what it means?

A. Lot number 72. "Re-sv. G. T. A." Is the same reference which I explained where it occurred in lot 75. "B. P." meaning that bleaching powder was used. The initials "$H_2SO_4$" refer to sulphuric acid used. "Blue" refers to aniline blue which we put with laundry starch to try and give it a good color. "V." is viscosity. "9:1" is proportion of nine parts of water to one of starch. And "20" refers to viscosity.

Q. That is, this "V. 9:1-15," means that under the particular viscosity test that you employed a mixture of nine to one of water and starch gave a viscosity of 15, is that right?

A. "V. 9:1-15." means that the starch was tested with nine parts of water to one part of starch, and that the viscosity of that test showed 15, which is lower than the water test. Water would only register 16 on that viscosimeter at that time, so that the body of this material was thinner than water.

Q. The symbols which you have explained above mean the same thing throughout this letter, do they?

A. Wherever this same symbol occurs it refers to the same chemicals.

Q. "Straight G. T. A." I presume, means untreated G. T. A., doesn't it, in this letter?

A. If I could refer to the record I could tell you better. What is your lot number?

[fol. 693] Q. 71.

A. No, it refers to G. T. A. unsieved, because the lot record shows that this batch was treated with chemicals.

Q. Now, in this letter, for example in connection with number 75, to which you have referred, where you refer both to hydrochloric acid (HCl and $Na_2O_2$), does that mean that both of these reagents were employed on the same batch of material, or that the lot was divided into two batches?

A. It means that both of those chemicals you inquire about were used on the same starch, on the same batch. The batch was not divided and these chemicals used separately, but all of these chemicals here which are listed on the different batches were used on the same batch of starch for treatment.

Q. I call your attention now to one of these process records to which you have referred, to wit: record of lot #71. I suppose where the same symbol is used in these records it has the same meaning as in the letter to which you have referred?

A. It has.

Q. "Tank #10" indicates the tank in which the operation was performed, does it?

A. In that case, yes.

Q. "Kind G. T. A." indicates that G. T. A. cassava was treated, does it?

A. Yes.

Q. What do the words "Inches of liquor, 53" mean?

A. It means that the liquor in the tank measured 53 inches in depth.

Q. And what does "Density 21" refer to?

A. Beaumé of the liquor 21 degrees. It means that the liquor is 21 degrees Beaumé.

Q. You mean the liquor containing the starch?

A. The liquor containing the starch in suspension, yes.

Q. It has no reference to reagent, of course?

A. None whatever at that point.

Q. Under the heading, "Pounds," and opposite certain initials there are numbers, as follows:

| | |
|---|---|
| 1030 Jax | 6510 |
| $Na_2O_2$ | 16 |
| NaOH | 32 |
| $Na_2O_2$ | |

These numerals indicate the weight respectively of the starch, sodium peroxide and caustic soda employed, do they?

[fol. 694] A. They do.

Q. Under the heading: "Time" I find "1:20-7P." To what does this refer?

A. "1" on the line marked "$Na_2O_2$ 16 pounds," under the heading "Time," under which is an "A." This "A" stands for "Am." A chemical was put in at 1:20 and was run until 7 p. m. on that day.

Q. Just go ahead and explain this, will you?

A. On the following line, starting, "NaOH 32 pounds," the chemical was put in at 1:25 and run in until 7:40 p. m. And the following line "$Na_2O_2$ 12 pounds," it took from 10 a. m. to 5:25 p. m. to get these chemicals in. This was the length of time taken to add the chemical to the batch.

Q. And will you please just go on and explain the other matter on this page?

A. "Dropped to number 4" means that the batch was dropped out of number ten tank to number four tank in the afternoon, p. m., which is indicated only by a "P" here, of March the 23rd. The first two chemicals having been

added on March the 20th, and the third and last on March 22nd. The next line, "stirred up A 3/25, 6 1/2" means that the liquor in number four tank was stirred up in the morning of the date, 3/25, to a density of 6½ degrees Baume.'

The next line following down the sheet, "Tabled fine-unsieved G. T. A." means that the starch when run out on the tables acted very well, and that the G. T. A. raw material used was unsieved.

On the line below, "Pumped to tank No. 13. Date 3/25" means that the batch was pumped to the tank with this number on the date indicated.

Next line, "Tabled 3/25" gives the date on which the batch was tabled.

The next line, "Into Kilns 3/27" was the date on which it was put into the dry kilns.

"Dumped to hoppers 3/29" is the date on which the starch had become dry, and was discharged into the hoppers, underneath the drying racks.

"Packed, Date 4/1" is the date on which the goods were packed.

"Pounds, 5,400," is the number of pounds packed.

"Loss 17%" is the percentage of loss which occurred during the process. This loss was on account of over-degeneration, or over-treatment, of the batch.

"Viscosity, warehouse sample 20-21" gives the viscosity of the finished sample drawn from the warehouse after packing.

[fol. 695] "By 9: 1 L. S." means the ratio of starch and water used in testing, and that it was tested by the use of live steam.

"Viscosity sample 55-55 By 4:1," ditto marks under the initials "L. S." above, means, that the viscosity (proportions were four to one of water and starch), was 55.

"Sold to L. M. P. 4/17," means that it was sold to L. M. Palmer on the date indicated.

Mr. Macauley: It is requested that this process record sheet be copied in full into the record.

(Said document was in words and figures as follows):

"Process Record

3/20/05.

Tank No. 10. Record of Lot 71. Date received: ——. Not Sieved. Gross amount from warehouse, 30 bags, 6,465. Kind: G. T. A.

Estimate of sieve loss: Net, 6,510.

Inches of liquor: 53. Density: 21.

When pumped into special dept.: 3/21.

Treated as Below

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 1030 Sax | 6510 | a | 3/20 | | 22 |
| " " Na O | 16 | 1:20-7P | " | | " |
| " " $Na_2O_2H$ | 32 | 1:25-7:40 | " | | " |
| " " $Na_2O_2$ | 16 | 10a 5:32P | 3/22 | | " |
| " " Dropped to ⇌4 P. | | | 3/23 | | " |
| " " Stirred up | a | | 3/25 | | 6½ |
| " " Table fine-unsieved G. T. A. | | | | | |

Pumped to tank No. 13 Date 3/25

Tabled 3/25

Iinto Kilns 3/27 Temp.

Dumped to hoppers 3/29

Packed, date 4/1 Lbs. 5,400 Loss 17% Moisture

Viscosity, W. House sample 20-21 By 9:1 L. S.

Viscosity, Sample 55-55 By 4:1 "

Loss

Sold to L. M. P. 4/17"

Mr. Macauley:

Q. Will you please explain — the same manner the test sheets which are annexed to this process record sheet.

[fol. 696] A. There are six of the test sheets atached to this.

Q. Why are there a number of test sheets to the one record sheet?

A. Because for some reason or other the batch, in addition to being tested along during the process, or about the time processed, was tested afterward on several different occasions, and part of the tests are made on a nine to one basis, and there is one test on the four to one basis.

The Court: That is sufficient explanation to enable us to understand what the papers mean.

Mr. Macauley:

Q. Is there anything to show when these various tests were made?

A. Each sheet is dated in the upper right hand corner.

Q. What did you mean by the note "Color good"?

A. That indicates that the color of the boil-up test when made was considered good for the purpose for which the batch was originally intended, which in this case would seem to be laundry starch.

Q. From what do you find that the batch was intended for laundry starch?

A. Simply from the general treatment used and the fact that the color was noted, and also the condition when cold was noted which was a requirement of the test made for laundry starch. It is impossible, however, to state positively what all of these batches were originally made for.

Q. This batch was made the 20th of March, 1905, was it not?

A. It was started the 20th of March, 1905, and finished on April 1, 1905.

Q. And it was sold to L. M. Palmer, April 17, 1905, was it not?

A. Yes, it was. That date 4 17 05, however, may be approximate. That might have been the shipping date from the factory. That is the approximate date.

Q. The sheet or process record of lot No. 70 is marked "Sago," by which I presume that Sago starch was there treated, is that correct?

A. Sago flour.

Q. And I also find on this sheet the word "Veneers," what does that indicate?

A. That would indicate that the batch was started with the idea of using it on veneers of some kind.

Q. And this record is also marked "Sold to L. M. P. 4/17," and I presume your remarks with reference to the record of lot 71 in this respect would apply to this sheet, would they?

[fol. 697] A. Yes.

Q. I find that the records of lots 69 and 68 are each marked "Sold to L. M. P." and dated 3/11/05; that lots 72, 74 and 75 are each marked "Sold to L. M. P. 4 17;" and that process record of lot 80 is marked "Sold to L. M. P. 4 18." I suppose that each of these lots were sold to Palmer about the date given, were they?

A. They were, and if you will go through that whole bunch of records you will find that there are not two processes alike in the whole bunch of records, and you will find that the viscosity of these different batches of starch average all the way from the thinness of water or thinner than water to raw starch itself, or untrested starch, and in the whole batch there were three lots started with an idea of using them in some manner as wood glue, and most of these batches or shipments here were made on the same date, and the goods were mixed in every conceivable sort of way in the Poplar Bluff factory and used up after a fashion, and it is no more like the goods that the Perkins Glue Co. is making today and has been making for years past than day is like night. Most of the stuff in here was made for laundry starch and was made for sizing or was made for carpet cop sizing, and you will find two records in there that are marked "Carpet cop sizing," with a viscosity down about that of water, and the goods were so weak that it was built up with regular Florida cassava, which you will find indicated on the records there, to give it strength enough to even build up a barrel head or hold it together.

Q. I call your attention to the fact that the process record sheets, other than those which I have mentioned, none of them state to whom the material is sold, though there is a blank for the purpose: that process record sheet of lot 42 is marked "Sold to H. D. Kendall, New York, 11 19:" that record sheet of lot 43 is marked "Sold to P. M. Company, Boston:" that record sheet of lot 50 is marked "Sold to R. M. Winans;" that record sheet of lot 62 is marked "Sold to W. C. R. Co. and H. C. Co. 2 17;" that record sheet of lot 76 is marked "Sold to Boston." Will you please explain how these sheets happen to be so marked if the material was sold to Palmer?

A. The sheet marked "Sold to H. D. Kendall" was so marked because the goods originally were shipped to the warehouse and stored as security for a loan made by H. D.

Kendall to Mr. Perkins, and were afterwards reshipped to Poplar Bluff. So the record reading "Sold to P. M. Co., Boston, Car No. 4" was stored in the warehouse in Boston [fol. 698] for a time, and may or may not have been put up for security for a loan to Mr. Perkins.

The record marked "Sold to R. M. Winans, 30 bags" indicated thirty bags out of a total of 20,750 pounds, was put in a warehouse of R. M. Winans & Company of New York and later shipped out.

The record marked "Sold to W. C. R. Co. and H. C. Co." indicates that a part of this shipment was made to W. C. Ritchie Company of Chicago for paper box adhesive or mixed in with different material in his factory where he made paper boxes. Part of it was shipped to the Hartford Carpet Company for mixing there in some way.

If I am not mistaken, if there is any further doubt or anything to be cleared up on the question of any of these process records—I have letters which would clear that up, and as I explained yesterday, our records were not complete at this time, and I have picked out what you yourself have proven, and which my letter there proves to be practically complete shipments made to Poplar Bluff. All of the goods shipped to Poplar Bluff at this time or at any later time have been a very different product to what we are making today; and the goods used at Poplar Bluff were in all cases a mixture of starch treated to varying degrees, usually very much overtreated, to which raw starch in varying proportions was added to try and get the strength, but at the same time obtain flow and spreadability. We shipped such material as I have just described to Poplar Bluff Plant up to the very last shipment that we ever made them. The records will show that if you want them to.

Q. What was the date, as near as you can recollect, when you first learned from Mr. Perkins or anyone else of a process which consisted in treating the starch with a two to three per cent by weight of the raw carbohydrate of strong sulphuric acid at a temperature below the bursting point of the starch, for the purpose of rendering the finished glue fluid with comparatively little water for the purpose of using it in the making of a wood joint?

A. I should say, according to recollection, it was the summer of 1907.

Q. And when did you first learn from Mr. Perkins or anyone else of the process of making a wood glue by dissolving starch with caustic alkali to the extent of six to ten per cent by weight of carbohydrate in three parts or less by weight of water, the weight of water being with reference to the weight of the starch?

[fol. 699] A. About the end of 1907.

Q. Are you the same Julius B. B. Stryker who on May 15, 1911, executed an affidavit in connection with an application of Frank G. Perkins, Serial No. 460,737, filed November 2, 1908, which is the application upon which patent No. 1,020,656 the reissue of which is here in suit, was granted?

A. I do not remember the patent number.

The Court: The original patent on which the reissue was granted?

A. Yes, sir, I do not remember the number.

Q. In that affidavit you state: "Prior to July first, 1907, said Frank G. Perkins described to me the process and product as set forth in said application, and I personally saw and helped Mr. Perkins to carry out said process and produce the glue product described therein. Also prior to July first, 1907, I personally saw and helped said Frank G. Perkins test the process and product described in said application, and glue together pieces of wood with glue made in accordance with the process described in said application. These pieces of wood which were glued together showed that the glue produced by said process had a remarkable tenacity, and that the glue was very satisfactory for use in wood joint work." In view of this affidavit do you wish to change your testimony?

A. No, I wouldn't say that I would change my testimony. I was depending entirely upon my memory, and the dates that I had in mind in testifying were, as nearly as I can remember at the present time, the dates when I, from my end of it, realized that the batches, as they were being made regularly in the factory from day to day were on a regular basis. Mr. Perkins was away from the factory practically all the time, and he kept giving me instructions to make changes in the process at the factory, and it was

about the date, according to my recollection, that the process was settled down into a steady thing, which I had in mind. Mr. Perkins gave me instructions time after time for changing the process, and I would change it and make the goods as nearly as I could make them in accordance with his instructions, as I understood he wanted them. And only to find afterwards that for some reason or other they were not right, and have to make further changes. But according to my recollection those troubles ceased at the factory in making large batches, about the time that I give.

Q. And then about the date that you have given, as I understand it, you made a satisfactory glue which was suit-[fol. 700] able for use for gluing wood joints, without mixing it with other materials, or mixing batches of glue of different degrees of degeneration, is that correct?

A. According to my recollection that is correct. About the dates I gave were the dates in which the goods produced were processed first by means of a uniform process, applied to all of the glue base made, which was shipped out and used without further manipulation, as by mixing when it was prepared in the customers' plants.

Q. And about this time you began sending out all the glue, did you, ready mixed, to the customers' plants?

A. Just what do you mean by "ready mixed?"

Q. I mean you ceased to send different grades of glue to the same customer to be mixed up by him?

A. I think that it was about this time that we stopped shipping all of the goods which were to be used or were used in some kind of a mixture of raw bases, and about this time we started in to ship out goods which had been processed at the factory in such a way that when it got to the customer's plant and was put into the form of liquid glue it would flow and spread and have all of the characteristic requirements of good glue. We had made up a number of batches of goods which were not right, and it may be that we shipped out some such batches after the dates I have mentioned, or it is possible that some mixture, in a more or less isolated case, might have been attempted for some other purpose. But I remember that in October, 1907, batch number 183 was put through process, and it was marked in such a way that we could keep special track of it, and after that time we have not changed our process. We have

kept strictly to that process, and all of the goods that we have manufactured since that time at the factory have been made according to that process.

Q. I notice from Brooklyn Cooperage invoice, which is marked "Defendant's Exhibit Brooklyn Cooperage Invoice and Papers, Number 24," and marked "Date of shipment, June 28, 1910," that the glue bags were marked H, and L; 134 bags being marked H, and 268 bags marked L. How do you explain that at this time you were still shipping out two grades of glue?

A. Why, my answer just made *made* referred to wood glue which was suitable for furniture and high class veneering, high grade veneering. I did not refer to the adhesive or the starch material we had been shipping to Poplar Bluff. As I said in a previous reply to one of your questions, we continued to ship to the Poplar Bluff plant for the [fol. 701] purpose that they used adhesives for, adhesives and mixed glue, up to the time that they discontinued buying from us, and I again repeat that that material is not the material which I contemplated in my former answer, nor is it material that we are shipping today to our regular furniture customers, or panel and top customers.

Q. Did the material which you said was marked "H. M." on the bags have to be mixed with raw starch to give a glue of the required degree of fluidity for use in making wood joints?

A. I don't know exactly how Mr. Perkins had mixed those different grades of material at Poplar Bluff. The proportions of each that he used, as a general thing, and the material used there was used with four parts of water to one part of the dry base, and if I am not mistaken that was invariably the case, unless it was in the case of a small experimental batch. And any material with which four parts of water is used is naturally different material from our regular glue base, with which the two and one-eighth to two and one-half parts of water are generally used by our customers at the present time, and for some years past.

I would simply answer the question by saying that the heavy, modified goods such as were shipped there, to give any fluidity at all or be capable of being spread with a machine on any kind of material, would have to be mixed with raw material and some degenerated material which would hold it together. What proportions I don't know.

Mr. Macauley:

Q. Then I understand you correctly, you had to mix this H. M. material with raw starch, and also with some of the lighter bodied material to make it flow properly, is that correct?

A. As I said in my former answer, I don't know how Mr. Perkins made all those mixtures, and my last reply is from experience that I have had from my work at the factory. There is all the difference in the world between making tests at the factory and making them in the customer's plant.

Q. From your experience at the factory did you find that this H. M. material had sufficient fluidity to be applied to wood to form a wood joint?

A. We made so many different things that were marked "HM" that unless you could specify some particular lot which was so marked, I would be unable to answer the question.

[fol. 702] Q. Then I judge that some, at any rate, of those lots which were marked HM could be applied, and some could not, to form a wood joint?

A. No, I wouldn't say that at all. The HM goods that were shipped to Poplar Bluff were shipped there and were used with goods which were marked "L", which stood for "light", and they were sometimes mixed with the raw starch, which is shown on those records. And the whole question of fluidity would depend on any base or any mixture, upon the proportions of water that were used to make the mixture. You might get a good enough flow at four to one on a certain mixture, but at two to two and one-half to one you would get no flow at all, and in all probability you would be unable to get it out of the glue mixer except by digging it out with shovels, or something of that kind. So that when you do not specify what proportions of water to be used, and you refer to the goods marked "HM" in a general way, I should answer your question by saying that a glue suitable for furniture veneers or veneers of that kind could never in the world be obtained from such a base. If this were possible I think Mr. Perkins would have discovered the key to the whole situation before he did, because he worked hard enough to do it, and it was a question of getting a starch material modified in such a way, and not carried too far, but carried on to the point where that

starch material would afterwards be mixed up with two and one-eighth to two and a quarter or two and one-half, possibly, parts of water and still it would retain its natural adhesion of the raw material to the extent that it would bind the wood together and make a joint which is suitable, and which is as good as the hide or animal glue joints which had been made previous to that time. And at the same time this glue had to be capable of flowing and being mixed properly, and being discharged into spreading machines and applied to the veneer. At the same time it had to be so that it would not soak into the wood and spoil the veneers or make "soak" joints or loose joints or blisters.

Q. If I understand you correctly then, this HM material in order to be dissolved up with four parts of water to form a glue of suitable consistency to be applied to wood, would have to be mixed with a lighter body, is that correct?

A. It was mixed with some lighter and some heavier, I believe. As I say, I do not know what proportions Mr. Perkins worked on, or all that he found necessary in this work at Poplar Bluff, but whatever he found there was for [fol. 703] the purpose of use in that plant, and it was not for the purpose of Mr. Perkins' invention as it is known today. Nor was the product as I have said, anything like the product today.

Q. Then your experience does not teach you whether or not it was necessary to add a lighter body of glue to this HM glue in order to mix it with four parts of water and form a suitable glue for application to wood joints, is that correct?

A. Well, for the work at Poplar Bluff there it could have been mixed pretty much any way. As I have shown by these lots here, which you have called for, the goods that were shipped to Poplar Bluff were made in a great many different ways, and they were different mixtures, and what possible kind of mixture a man might have for veneer work, what he might have gone into there with those combinations, I really can't say.

Q. Well, I haven't asked you what they actually did at Poplar Bluff. You have stated that you were the one at the factory that made the tests of this glue. Now you ought to be able to tell whether or not this H. M. glue was sufficiently fluid when mixed with four parts of water to

form a glue applicable to a wood joint. Can you tell us that or not?

A. Do you mean by just taking the H. M. alone and mixing it with four parts of water?

Q. The H. M. alone, and mixing it with the proper amount of caustic soda and four parts of water.

A. Why, how much caustic soda?

Q. Well, say around about seven per cent by weight of the starch material employed.

A. I judge that under those conditions the H. M. goods, as I remember at this time, would come a long way from making the wood joints that I have been speaking about, and I doubt very much if it would have done for our Poplar Bluff work if used alone.

Q. On which side do you think it would have fallen, being too fluid or not fluid enough?

A. Why, from any recollection I suppose it would be rather too fluid. Another thing you must bear in mind is, that the batches made at the factory were made under instructions as nearly as possible, and indications gotten there were test indications only. We were utterly unable or unprepared to make anything like the factory test on anything down there.

[fol. 704] Redirect examination:

Referring to my cross-examination where I stated that I supposed our glue was not satisfactory for the use of the Hood & Wright Company, I meant that it might not have been satisfactory for the reason that the veneer presses they had in their plant at that time were old and antiquated screw presses, and were not capable of giving the required amount of pressure to use Perkins glue. That the people were not inclined to put in modern veneer presses. But they told me that the glue itself was all right, and in fact they have recommended Perkins glue to persons making inquiry from them. They said that the glue was all right.

The shipment to Cairo, of which I spoke yesterday, that was in 1905. Mr. Perkins went there sometime in 1905 and made the tests, built up some panels and made this test, and the people there told Mr. Perkins that they would consider the matter sometime later, and it was more than a year later than this that they again took the matter up.

Referring to the material shipped to the Wilts Veneer Company, at Plymouth, North Carolina, that I believe was in 1905 or 1906. They did not continue to use Mr. Perkins' adhesives. Mr. Perkins was working in their plant, as I remember it, off and on for several months, and the final result was that he quit there, and at their request we took back a large quantity of material he had shipped there, and paid them something like $2,000 for the goods that we took back. The starch base we shipped to the Wilts Company was entirely different from that we are selling today. The material shipped to Plymouth, as I remember, was of much heavier body than we are making today; it required three and one-half to four parts of water to get it into solution so it would flow or spread at all, and inasmuch as so much water was used with it, it would not make a strong joint. It was not even strong enough for the joints that the veneer people were making for box shooks.

As to the business situation of our company during the first half of 1907 with regard to the making of a furniture veneer glue, well, the situation was mostly troubled. The glue that Mr. Perkins was trying to use had proven up to that time not right, and I supposed he had the right thing when he went to South Bend to make the tests for use there, but he would write me one day that the thing was all right, and the next day he would write me that everything was all wrong. He gave me various instructions along about [fol. 705] this time for trying out batches in different ways. I tried them out to the best of my ability, but it was exceedingly discouraging; to the point that I on one occasion resigned my end of the job and later reconsidered it, and decided to go along a little longer. I was, I suppose, disgusted with the proposition. I was certainly discouraged to the point that I was ready to quit, and would have quit a good many times if it had not been that I was working with Frank Perkins.

I refer to the proposition of trying to make glue and the working out of the glue in successful use at that time. We thought a great many times that we had it right, but every time one trouble was overcome it seemed as though at least one more trouble took its place. Sometimes it seemed as though it went backwards instead of forwards.

The company, or the officials of the company, very seriously considered giving up the business of making this veneer glue. At one time it was practically done, but we took a fresh start and held on until the present time.

Referring to lot No. 183 mentioned in my cross-examination, it is identically the same process we use today in making our vegetable glue. We first tried out that process in the factory in October, 1907.

Referring to my testimony in cross-examination of having certain troubles in our customers' plants today, such as veneers being of uneven thickness or wet and not dried straight, etc., these troubles are equally applicable to animal glue. They have always had trouble with animal glue.

Regarding my testimony that when a lot was over treated or under treated, we would mix raw or over treated starch with the original in 1905 and 1906, we did not then know how to make the proportions. It was all guess work. I do not think, if we had the same starch bases here today, or perhaps some of them which we had in 1905 and 1906, that I could get proper mixtures of them with raw to make a fairly good glue. We never got proper mixtures with anything to get a wood glue.

Regarding the shipment to Poplar Bluff in 1905 of Perkins veneer glue, this was entirely different from what we sell for veneer glue today. I do not know why it was called veneer glue at that time. I suppose Mr. Perkins wanted some name to bill it by.

Regarding getting a fair start in the fall of 1906 at South Bend, I meant by "fair start" that somewhere late in the fall was the first time that the proper mixing kettles [fol. 706] and glue spreaders were available and placed in position for use or trial at that plant.

Beginning sometime during 1907, the latter part or so, all of the shipments we made to regular veneer customers were made according to a single or the same process, and the goods we were shipping to Poplar Bluff even long after that were still made differently, or were shipped in quantities intended to be mixed, that is, different kinds to be mixed. We continued shipping different kinds of starch bases to Poplar Bluff clear down to 1910, even although we were shipping our other regular veneer customers entirely different products.

Redirect examination continued January 21, 1915:

Referring to my statement that we have about twenty-three hundred process records running substantially down to date, I mean that we have made about twenty-three hundred lots since about the first of 1904. About twenty-one hundred of these have been used for furniture veneer work. Some of the rest were shipped to Poplar Bluff and for sizing cotton goods and such purposes, and laundry starch.

Referring to the fact that a great deal of goods shipped to Poplar Bluff in 1905 had been put up as collateral, the fact that we had so much of these goods so mortgaged had considerable to do with our shipping them to Poplar Bluff.

The goods had been put up as collateral and the business was in a bad financial way and very much in need of money; and Mr. Perkins went to Mr. Palmer and told him the conditions and got him to consent to allow the shipment of this large quantity of material to Poplar Bluff, and it was so shipped in a few months' time and was sufficient to run them for a year and a half or two years, as it turned out.

Q. But how did it happen that the Poplar Bluff concern or Palmer bought so much starch base in the spring or summer of 1905 if it was not giving satisfaction?

A. Well, Mr. Palmer's headquarters were in New York City and Mr. Perkins saw him there and told him of the situation referred to, and Mr. Palmer allowed Mr. Perkins to make the original tests and ship considerable quantities for that purpose. Mr. Palmer, however, did not know of the difficulties, troubles, that Mr. Perkins was actually experiencing at the plant at Poplar Bluff, and Mr. Perkins tried to work out these troubles as best he could, and without drawing it particularly to Mr. Palmer's attention, as [fol. 707] he did not naturally want to excite Mr. Palmer's fear in the matter in any way.

Q. In one of your answers yesterday you stated that there are not two processes alike in the whole bunch of records relating to the 1905 Poplar Bluff shipments. You also referred to mixing different goods in different proportions. Will you explain a little more fully about these matters?

A. As stated in answer to the question yesterday, the goods shipped to Poplar Bluff during this period consisted

of materials made from tarch or sago flour or made differently, different processes were used on these goods, and the body or viscosity of these different batches was very different. In fact, it varied all the way from the thinness of water or even thinner up to raw starch itself and these batches were mixed up in all sorts of different combinations in order to get material which would flow, spread and even with the four parts of water employed the batches were oftentimes too thick. When any goods is too heavy and as much as four parts of water has to be employed there is very apt to be trouble of this kind. I have known of one instance of goods of this kind resulting in such a heavy, thick and pasty mixture that a shovel had to be employed to dig it out of the kettle in which it was mixed up and converted; it could not be flowed through the pipes between the mixing kettle and the spreader, even.

Q. What were the goods shipped to the Hartford Carpet Company intended to be used for?

A. For sizing of stiffening of cops. This was largely in the order of a size material.

Q. Would any starch base which would require four parts of water to make it spreadable be materially different from your regular glue base with which you use less than three parts of water?

A. Yes.

Q. In your cross examination you referred to obtaining suitable consistency and the key to the situation. What do you understand to be the practical problem that Mr. Perkins had worked out in 1907?

A. I understand it to be discovery of proper means, to in the first place, modify a starch base to a certain defined and recognized point, this modification not being carried too far but at the same time far enough; and in the requirements of the glue using industry the amount of water that could be used was restricted to certain limits, these limits being in most cases around two to two and a half parts of water. To get the proper glue base for this the natural [fol. 708] strength or adhesiveness of the raw material had to be retained to the largest extent possible, and this Mr. Perkins succeeded in doing and his product was capable of use under practical factory conditions in that it could be mixed in required quantities and would flow readily and as

required from mixing kettles to the spreader. They were capable of being applied properly. At the same time the product, as he worked it out finally, would set properly and would not soak on the veneers.

Q. Referring to the Poplar Bluff shipments in 1905, were all of these goods which you shipped there in 1905 which had been very much degenerated intended to be mixed with raw starch or starch that had not been sufficiently degenerated to stick the barrel heads together?

A. Yes.

Q. Three of the many process records you have produced relating to 1905 Poplar Bluff shipments have on them the word "Veneers." You have stated in cross examination that this indicates that these processes were started with the idea of using them on veneers of some kind. What kind of veneers did you mean and did the word veneers have the same significance then as it does today to you?

A. We had in mind the making of barrel heads, which is indicated, I think, by the record referred to, and these barrel heads, in fact, were the only thing about which we knew in this line at that time; and the word veneers or veneering today in my mind does not have the same significance, as it had at that time, for the reason that speaking or thinking of veneering today I have in mind the veneering industry as applied to making furniture or doors or sewing machine tops and things of that kind, and I believe that this is the meaning generally given to the use of the word today in the trade generally.

Q. When was it Mr. Perkins died?

A. He died in September, 1910.

Q. What are the advantages of your present process of treating the starch in the first step with caustic and peroxide of soda over the acid treatment for degenerating starch?

A. The advantages of the alkaline process over the acid process referred to would be summarized as follows: The alkaline process is more easily controlled than the acid process, the latter having to be held to more closely confined limits for the reason that slight overtreatment or undertreatment by this process results quite seriously in the finished glue product. The alkali treatment is a somewhat better treatment in view of the fact that a more uniform [fol. 709] product can be obtained and the dissolving up

or second step of the process when applied to the alkaline processed goods works somewhat better in that the finished base made by the alkaline process seems to take somewhat more kindly to the subsequent second step of treatment where the solvent is added in a more or less varying proportion.

Q. What do you mean by "take somewhat more kindly"?

A. I mean that the subsequent addition of the solvent in the second step as carried out in the customers' factory will tend to give more uniform result, as in case the base has a more or less akaline reaction the solvent would act on the base better than in the case of acid made goods which through an error or oversight might be left a little acid at the end, such an acid reaction in the customers' plants when the second step was applied would be quite apt to throw off the action of the solvent used when the glue was converted.

Q. Does one mix any easier than the other?

A. The finished base made by the alkaline process will dissolve somewhat more radily when mixed in the second step than the acid made base; and the more readily the base can be dissolved and with the minimum chance of going wrong or delay in the operation, of course is very desirable.

Q. Why is it that the alkali or double soda process is more easily controlled than the acid process?

A. Well, when the required amount of the chemicals used for the purpose of modification in the alkaline process are employed at the outset, the question of the modification being carried too far is not so dependent upon the question of time of treatment as applies in the acid process. After the chemicals of the alkaline treatment have done their work the stirring could be kept up for a longer period, but in the case of the acid and heat treatment if the quantities of acid first employed were correct the question of time is a most important one, in that if through any error or oversight or inability to stop the action of the heat and acid at the required point the resultant modification of the base would be carried too far.

Q. There is testimony in the case, I believe, that about 1909 you shipped goods to the Poplar Bluff concern all in one bag. What was that? What were those goods?

A. About that time the goods referred to consisted of 183 goods, sago flour and raw starch mixed dry in the bags at certain proportions of each. These were mixed at our factory.

[fol. 710] Q. Prior to the time you started sending them this mixture what did you send them?

A. We had sent them all sorts of things, lots or batches made by different processes, processes some of which were carried out very, very low and some of which were carried not so low. Others were less modified still. Other lots were Florida made cassava starch and others were imported cassava flour or starch. They were made in all sorts of ways and consisted of the starch referred to and sago flour.

Mr. Crosby: Q. After 1906 did you ever ship this Poplar Bluff concern starch products which you had made for entirely different purposes but which turned out to be unsuited for those purposes, and if so, to what extent?

A. We did make such shipments and to a considerable extent. I should say, of the balance of the material we shipped them.

Q. What were these materials made for; that is, what were they intended for when you made them or started to make them?

A. Sizing, paper box adhesive, and I believe laundry starch.

Recross-examination:

Carpet cops are threads, certain of the threads or yarn used in weaving carpet; that is not the ball of such thread or yarn, necessarily. It is the thread or yarn which is used in the carpet or rug in weaving and is sized. This sizing was applied to the thread itself. The word "cop" is usually used in the weaving art to refer to a spool or ball of the material.

As to how much over treatment by the acid process is seriously objectionable, why, the acid treatment should give a product which will not become lardy or pasty when it is converted into liquid glue, and it does not take very much overtreatment to bring about that condition.

Q. Well, will you compare in the matter of time? Suppose, for example, the acid process required twelve hours

to effect a proper treatment, how much longer could you carry the process without seriously overtreating it?

A. Well, that would depend very much on what your treatment consisted of.

Q. Would it be a matter of hours or minutes? I want to know approximately.

A. It would be less than a hour, probably.

Q. Then I suppose that ten per cent overtreatment would be seriously objectionable, would it?

[fol. 711] A. That would depend upon what the ten per cent was based on. You are speaking generally.

Q. Speaking of the matter of time, we will say.

A. Yes.

Q. That would be objectionable. When were the various lots which are described in the records which you brought into court yesterday, the dates of shipment of which are not given on the records, shipped to Poplar Bluff?

A. Between the early part of 1905 and August, 1905.

Q. Can you state any more definitely than that?

A. I believe most of these lots were shipped toward the early part of the period from the first of the year until August. That is as closely as I can come to it from memory.

Q. Now, quite a number of those lots are dated as sold in April. Do you think that the undated lots were shipped earlier or later than that time?

A. I can't say.

Q. In answer to a previous question you stated that according to the best of your recollection "Possibly 200,000 pounds or less" of sizing materials were turned out in 1904. Would you say that you turned out as much as 150,000 pounds in 1904?

A. I can't remember. I might look that up, if you want, if I have anything on it.

Q. Well, you might do so, please, and bring it in at the next session. About how long did you have a man at the Table factory trying to introduce your glue?

A. Why, according to my recollection, the man was in and out of the factory there for a month or two, but he was not actually employed in trying to introduce the glue all of that time. Probably only a week or ten days.

Q. You may answer the same question with reference to the Hood & Wright Company of Big Rapids.

A. I cannot remember.

Q. And how about the Votey Organ & Piano Company?

A. I think a man went there several times during the period of a month, probably, but in that case, if my memory is not at fault, he was not gluing up any stock more than three or four days of that time, and all that I saw of the stock glued up was very good.

Q. You stated that the material shipped to Plymouth was of much heavier body than you are making today. Was it raw starch?

A. Some of it was, as I recollect.

Q. And some of it was treated starch, was it?

[fol. 712] A. That is my recollection.

Q. You have stated that one of the objections to the acid process was that the glue base formed thereby might be left slightly acid. Now, the acid process, as I understand it, calls for neutralization, and when you neutralize is it not as easy to leave it a little over alkaline as it is to leave it over acid?

A. I should hardly say so. If your attention is drawn to it and you are working on that particularly, a man is much more apt to follow it out and get it right. You know what I mean.

Q. If you added a trifle more alkali than was necessary to neutralize the starch, you would get it slightly alkaline rather than slightly acid, would you not?

A. Yes.

Q. Did you change your understanding of the word "veneer" before or after the matter of this suit came up?

A. Long before the matter of this suit ever came up or was ever contemplated.

(The process records referred to marked "Plaintiffs' Exhibit 79.")

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TESTIMONY OF WILLIAM H. WENRICK, A WITNESS ON BEHALF OF COMPLAINANT IN REBUTTAL JANUARY 19, 1915

I am superintendent of the veneer laying department of the Singer Manufacturing Company, South Bend. My

duties are such that I am familiar with the glueing up of veneers in the Singer plant there. I have been familiar with these for the past twenty years.

I remember Mr. Frank G. Perkins coming there to try out a vegetable glue of his. This was in the fall of 1906. He did have trouble using his glue there. He was there for over a year, until the fall of 1907. I did have something to do with the work on this glue of Mr. Perkins. I was helping him to get a mixture that would work. I was helping him practically all the time he was there.

As to troubles, well, the troubles as we had them, were to get the mixture so that it would flow, and so we could spread it, and to get the "set." We had trouble with the mixture. Sometimes it would become very short, and it would not remain fluid over night. And at other times we had the mixture so that it would separate and become sort of watery over night. And we experienced other trouble, of the mixture not setting, and the glue joint not drying, the glue not becoming hard. When the joints were [fol. 713] broken the joint inside seemed to remain damp. We had this condition of that kind until finally we struck a solution of mixing certain proportions of glue and water and caustic soda that gave us a fairly fluent mixture; in fact, it was fluent enough to do the work, and that gave us the set and gave us the strength we needed for the good of the wood joint that we were trying to make. It was along about September, 1907, that we got these qualities that I have last spoken of. During the interval Mr. Perkins did have trouble with regard to getting that glue sufficient strong, as well as with these other qualities of which I have spoken. I have spoken of the joints remaining wet. That is what we call soak joints.

We used this glue on all veneer sewing machine parts. We have used Mr. Perkins' vegetable glue ever since that time at the Singer plant. We have tried out casein there for this work. The casein worked very unsatisfactorily. We found it would be very ununiform, and we found it to decompose very rapidly after being brought into solution, and we found the joints to remain wet. And also it did not give the strength necessary to make a good veneer joint. We gave up the use of casein for these reasons.

The processes which Mr. Perkins used for mixing the glue and the glue itself, say, in the early part of 1907, did not satisfactorily do the work that we desired on these sewing machine veneers.

Cross-examination:

The first time that Mr. Perkins came to the Singer plant, to my knowledge, was in 1905. He came there taking in a general view of the situation as we had it there, the veneering end of the business. He did not make any experiments or bring any glue with him that I know of. So far as I know he never glued up any material during 1905 at the Singer plant in South Bend. As to his duties, further than to look around, in coming to South Bend in 1905, I do not know of any. He inspected the glue plant.

As to what other glue, besides starch glue is used at the Singer plant, I would say animal glue. We do have trouble with animal glue. We have had to reject some animal glue. The engineering department has charge of its acceptance or rejection. I haven't any say as to whether the glue material is accepted or rejected at all.

I was not at Cairo in 1905 or 1906.

As to changes made in the machine which was used at South Bend in 1906 and 1907 for glueing veneers, it was [fol. 714] found that we had to make changes, that is, the vegetable glue was of a more stiff and tenacious body than the animal glue, and it was found that we could not spread it with the same sort of a machine that we did the animal glue, and we had to make a different style of machine. We also made changes in the tanks which were used for dissolving this material.

As to percentages of water and starch we used during these experiments that Perkins was making, we varied from three parts of water to one part of starch, to two and one-quarter parts of water to one part of starch, as I remember it. As to the percentage of caustic soda, we varied from three to ten per cent. In the beginning, it runs in my mind, that we used less than three per cent of caustic calculated with reference to the starch; that we went as low as one-half of one per cent. The experiment with one-half per cent was not satisfactory. The solution in itself did not have the right consistency and did not set as it should and did not

seem to give the proper, necessary strength. We did use heat, 180 to 190 degrees. We also used heat when using three per cent mixture. It operated in two different ways, that is, with the high degree of heat it immediately broke down the fiber of the mixture and made a short, pasty mixture, that had no adhesive qualities, that is, none strong enough to consider making a veneer joint. And with a lower degree of heat it did not seem to throw the mixture in solution fluent enough to spread, and also it did not seem to give it drying qualities or setting qualities.

After trying the three per cent, we tried it at five per cent. That acted similar to the three per cent. We used heat in connection with that; very little heat in connection with that. As to who, besides myself and Mr. Perkins, was familiar with these experiments that we tried in 1906 and 1907, I had an assistant with me at the time that was familiar with them. He was Mr. Robert C. Wendt. I do not know where he is now. The last I knew of him he was living in South Bend.

I met Frank Baker at South Bend. As to when I met him there, I am not really positive of this, but I think that was in December of 1906, or in January or February of 1907. The work that we were glueing up at the Singer plant at that time was veneer sewing machine parts, that is, table tops. Those table tops were composed of from three to five layers. They were oak and walnut and gum on the outside, one-twentieth of an inch thick.

As to the proportion of water and vegetable glue material that we used at this plant in glueing veneers, as I remember, [fol. 715] it was two and three-quarters of water to one of glue. The first percentage of caustic that was used with reference to the starch was one-half of one per cent; as I remember, that is correct. The next mixture that we used, we used three-quarters of a per cent; and then after that, three per cent. This three per cent mixture was in the fall of 1906 possibly between two and three months after Mr. Perkins first went there.

As to the procedure we followed in mixing up the glue material, well, in the beginning we weighed or measured in the water into the mixing kettle, and then we gradually mixed in the starch. Well, in mixing with the lower percentages of caustic soda we put the caustic soda into the

water before we put the starch in, and then after the starch was in the water and thoroughly mixed up we turned on the heat until it thickened up and changed in color. That is, we first drew our water into the kettle, then added our caustic soda, that is, one per cent, and then heated the water to about 190 degrees after we put in the starch.

As to whether I know of any other plants in which they are using this vegetable glue, Perkins glue, I would say St. Louis Basket and Box Company was using that the last I knew about it. A plant down in New Albany, Indiana, the Indiana Veneering and Paneling Company. I do not know any other place I can say just now. I was never at these other plants during the time that the process was being installed.

Redirect examination:

Referring to our rejecting animal glue at times, this was done because it did not come up to the test required, that the contract called for, as I understand it. It did not come up to the requirement of the contract and therefore I should say it was a poor grade of glue.

As to whether, when we get the good grade of animal glue, we have trouble with it, well, no, I wouldn't say you would have any trouble with a good grade of glue.

We use the animal glue for different parts of cabinet work. They call it a different class of work. It would be joint work, you would say. We do not ever mix up the Perkins glue with three per cent caustic and heat.

Recross-examination:

We use animal glue on the joints instead of the vegetable glue principally on account of the quick action of the set there that enables it to be taken out of the clamp immediately the glue becomes sufficiently hardened to allow any [fol. 716] ordinary handling at that time. The vegetable glue ordinarily takes six to seven hours to set before you can take it out of the retainers. At the end of six or seven hours we ordinarily take it out of the retainers.

As to how long it takes the animal glue to set, on veneer work we run that from four to five or six hours. When I say that, I would say the same class of flat veneer work

with the animal glue would come out in from four to six hours.

For a number of years we used animal glue for glueing the veneers together just as we used vegetable glue; that is, we did that in my entire knowledge of the business up until we began with the vegetable glue. We never adopted the casein glue. We tried it. With the animal glue, when used for veneers, the amount of water would vary according to the grade of glue which we used and the class of work used. We have used various grades of animal glue. It would vary from one to one-half up to two and one-quarter to one; that is, one and one-half parts of water to one of glue up to two and one-quarter parts of water to one of glue. When we use the animal glue now for joint work we use from about one and seven-eighths to two or two and one-quarter. We vary the percentage of water to glue according to the uses to which we put it and the grade of glue that we have. We also use this animal glue on some work that we call bent work. That is where you build up a layer of veneers and bend them into different curved shapes and retain them in a form that will give you the desired shape that you want. We used animal glue on this bent work instead of vegetable glue for the reasons that I mentioned before; the setting qualities of the glue, which enables you to take it out of the form in a shorter period of time. That is, we do it just to save the hour or two of time because an hour means several forms, and different kinds of forms, as a rule, are of considerable expense.

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DEPOSITION OF GEORGE L. FROST, TAKEN ON BEHALF OF PLAINTIFF APRIL 29, 1914

I am president of the Frost Veneer Seating Company and reside in New York City. I was assistant treasurer for that company in the year 1906.

I did know Mr. Frank G. Perkins. I met him at the office of the company; in the winter of 1906 he came there to introduce his glue. I think it was in the latter part of Janu- [fol. 717] ary or the first part of February. At to what Mr. Perkins did towards introducing his glue in our factory, well, we gave him carte blanche at the Jersey City factory

and he shipped his machinery there and also the glue. As to whether he tried to use the glue on any of the products of our factory I would say yes, we gave him veneers and he glued up several panels for us. These panels were the kinds that would be used for parts of furniture or for interior decoration. As to how long Mr. Perkins was trying to introduce his glue at our factory, he was there off and on from the early part of February to the early part of May, 1906. I have means of verifying my recollection in this regard, we have the sales ledger of the company showing several charges to Mr. Perkins. I produced the said sales ledger, and point out therein the accounts showing the charges to Mr. Perkins as follows, the account starting on page 569:

"F. G. Perkins

Debit Side

| | | | | |
|---|---|---|---|---|
| | | | C | |
| Feb. | 15. | Frt. 4 48 exp. .40 .35 | 253 | 5 23 |
| | 17. | " | " | 56 |
| | 23. | Exp. | " | 50 |
| | 27. | " 2 b. 3 95 b. 50 | | 4 45 |
| | 28. | Cash | " | 10 00 |
| Mar. | 3. | Ch. ex. | C 263 | 4 71 |
| | " | Cash | " | 50 00 |
| | 10. | Ex. ck. | " | 10 00 |
| | 17. | " | " | 50 00 |
| | 24. | Sunds. expr. | " | 10 00 |
| | " | 3/24 ex. ck. | " | 40 |
| | 30. | Sunds expr. | " | 25 00 |
| | 17. | | | 6 40 |
| | | Amt. to page 119 | | 177 25 |

Page 119

F. G. Perkins

| | | | | |
|---|---|---|---|---|
| | | Amt. from page 569 | | 177 25 |
| 1906. | | | | |
| Mar. | 31. | | P. B. 65 | 5 93 |
| Apr. | 3/19. | Inv. Page Belting Co | P. B. 66 | 6 91 |
| | 3/31. | Collins Lavery & Co | 66 | 23 06 |

| 1906. | | | | |
|---|---|---|---|---|
| Apr. | 9. | Oswald Rudolph | 66 | 8 93 |
| | 7. | Theo. Smith & Sons Co | 67 | 99 74 |
| | 3/31. | John S. Menagh Co | 67 | 18 31 |
| May | 7. | Cash Adv. Am. C. GEF 150 | | 20 00 |
| | | | | 360 13 |

[fol. 718] Credit Side

| 1906. | | | C | |
|---|---|---|---|---|
| Mar. | 5. | | 256 | 50 |
| | 17. | | C 262 | 50 |
| | 24. | | C 264 | 10 |
| | 26. | | C 264 | 25 |
| | | Amt. to page 119 | | 135 |
| 1906. | | | | |
| | | Amt. from page 569 | | 135 |
| June | 30. | Balance to L/8 | | 225 13 |
| | | | | 360 13" |

It is hereby stipulated by and between counsel for the respective parties, that subject to correction, should error be found to occur, the above may be accepted by the court as a corrected copy of the items found in the ledger under the account of F. G. Perkins, and may be used as evidence thereof, with the same force and effect as if the original ledger book had been duly proved and offered in evidence.

About two-thirds of the items I have referred to are in my handwriting, I think. All of page 119 and all of page 569, beginning with March 3rd.

As to the glue which Mr. Perkins was trying at our factory, I understood it to be a vegetable glue. We did not ever commercially use this glue, because Mr. Perkins was unable to prove that it was satisfactory for our work. As to why it was not satisfactory, the principal reason was because it would not hold. As to another reason, it discolored the wood on account of penetration. As to what I meant when I said "it would not hold," I mean that the

veneer could be easily torn apart. At that time we were using hide glue in our factory. We are using hide glue today. The glue which Mr. Perkins tried to demonstrate at our factory in 1906 was wholly unsatisfactory and we decided that we would not be able to use it, and we have been using hide glue ever since.

Cross-examination:

Mr. George E. Frost, my uncle, was in charge of the manufacturing end of the business of the Frost Veneer Seating Company in the winter of 1906. Yes, I did personally have conversation with Mr. Perkins before he began his attempted demonstrations. He stated that he had a glue which would be much more economical for our work, and asked if we would allow him to try it out. I do not remember him saying anything about whether his glue [fol. 719] was being successfully used elsewhere. I do not remember his stating that his glue was being successfully used at Poplar Bluff. I do not remember his mentioning that place at all. As to whether he said anything about the Singer Company, I would say no, that was long before the Singer Company. As to how do I happen to know when the Singer Company used it, I have been told that the Singer Company tried the glue about two or three years after Mr. Perkins tried it at our factory. I could not say who told me.

The product of the Frost Company between February and May, 1906, was the same as it always has been, manufacturers of veneer built up and compound wood; not for chair bottoms only; for any purposes. At that time they were making and we make anything that can be made out of veneering. We do not know what our customers use our product for. They might use it for furniture, for wall panels. Our company makes up sheets composed of a plurality of layers of veneering glued together and sell it in that form and the customers cut it up and use it for what they use or may receive order for making up any kind of veneered work for which the use may or may not be specified. As to the material which Perkins was attempting to demonstrate at our works, when it was received it was a dry powder. As to what he did to that

powder, it was dissolved in water. Nothing was added to the water that I know of. As far as I know of, it was dissolved in water merely. As to whether any heat was used in dissolving, yes, there was heat. The glue was dissolved in a kettle which was heated by steam. I do not know how long it was subjected to this steam heat. I do not recall whether Mr. Perkins brought with him or sent to our works any chemicals.

Yes, I do know what the business of either of the concerns mentioned in the items on page 119 of the ledger previously referred to was. The Page Belting Company are manufacturers of belting. Collins, Lavery & Company are lumber dealers. Theodore Smith & Sons Company are machinists. John S. Menagh Company are hardware people.

As to what is the strongest glue for veneering purposes on the market today, I consider hide glue. As to how does the price of hide glue compare with that of other kinds of glue, hide glue is the most expensive.

Redirect examination:

As to whether Mr. Perkins may have used some chemical or chemicals in the water in which he dissolved his glue, I [fol. 720] do not know whether he used chemicals or not. He might have used chemicals and I would not have known about it.

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Plaintiff's Exhibit 3, Periodical. "Glue," October, 1910, Blue Penciled Article, p. 14 "Three Kinds of Glue"

Three Kinds of Glue

Glues three—animal, vegetable and mineral. Yes, and every one the best for some purpose, while it is also possible to use any one of these three for the same kind of work. Take, for instance, veneering. Animal glue is there the old standby, thought to be the glue—the only glue—until Perkins showed what the vegetable adhesives could do. Hardly were these adhesives tried out before there was a newcomer—the silicate of soda. Which is best? What is cheapest? Only a Glue Engineer can tell.

PLAINTIFF'S EXHIBIT 4, "THE FURNITURE MANUFACTURER AND ARTISAN," NOVEMBER, 1914, ARTICLE AT P. 226, "SOME MORE ABOUT VEGETABLE GLUES"

## Some More About Vegetable Glues

### Views and Interviews Concerning a Product Now Being Used in Furniture Industry Which Has Passed Experimental State and Contributes to Economy

By A. B. Maine

As one becomes more and more familiar with the furniture industry he can not help but be greatly impressed with the ultra-conservativenes of those engaged therein. There are, to be sure, some individuals who have a keen spirit of initiative, and who will adopt a new method, or a new machine, if it has apparent merit worthy of consideration, but far the great- number seem bent on preserving the traditions of their forefathers, especially in the manufacturing end of the business.

Considering the competition which marks the making of furniture it is easily understood that the manufacturer feels the necessity of being careful not to adopt some new thing which may tend to increase the burden of the plant, or to lessen the quality of the product, but one would naturally suppose that this same competition would keep the manufacturer alert for any change which might lessen the burden without injury to the quality, or raise the quality [fol. 721] without increasing the burden or help both the burden and the quality. That furniture manufacturers, as a class, are not alert is shown by the fact that one may find many plants today where there are no self-feed rip saws, no automatic jointers, no modern dry kiln equipment, no varnish sprays, no varnish dry kilns, few material trucks, no endless bed sanders, and in fact scarcely any of the more modern machines, or methods, in use.

If the user of new methods had to bear the burden of proof, the apparent reluctance of adopting these new methods might be more easily understood, but in these days the reputable manufacturer of new equipment, or new product, is the one who stands that burden, and he is usually ready

to bear the expense to prove that the use of his article will be beneficial to the user.

## Great Gain in Its Use

To cite a concrete example it may be well to consider the use of vegetable glue—that produce which is now being used in the making of practically every kind of furniture from the cheapest to the most expensive. It is no credit to the users of this material that there have been more installations of vegetable glue equipment during the current year than in any previous year of its history, for the reputable manufacturers have been just as ready in the past to assume the burden of proof as they are today. Yet in spite of this fact the spirit of skepticism is so strong that many large glue users, as well as the smaller ones, still hesitate about its acceptance.

The first vegetable glue room that the writer saw was in a case goods factory in a town located almost in the center of Wisconsin. Entering the office one morning last December, when the outdoor temperature was way below zero, inquiry was made for the manager, and information received that he was in the facory but would return to the office shortly. (For convenience in narration the personal pronoun will now be used.)

When the manager came in I introduced myself and told him that I had heard that he had one of the most thoroughly equipped factories in point of safety to be found, and asked that I might be allowed to see the plant.

"You certainly are welcome. I'll take you around," he said, and then began an interesting visit. We passed through several departments paying special attention to the safety question, and let it be stated here that they certainly did believe in safety there, but coming in due time to the panel glue room my host said, "We pride ourselves on our safety devices, but we are equally proud of our [fol. 722] glue room. We are particularly fortunate in being successful users of vegetable glue. Here you will see all the operators at work today, yet before we started to use this glue there were many mornings in winter when this department could not operate on account of the glue congealing, or because the veneers got cold before they could

be properly laid and placed in the presses. If we were using animal glue we could not work here today, because we need absolutely all the steam that we can get to keep the building comfortable. Under no conditions, that I can think of, could we be induced to return to the use of animal glues, because we get out as good product with less waste and effort by using vegetable."

"Don't you have any trouble with this material?" I asked.

### Less Trouble than With Other Glue

"Not near as much as we had with the other. At first, we had some troubles, but the manufacturer kept his demonstrator with us until these had been solved. Now we have hardly any. When we do it is found to be our own fault because we fail to keep to the proper use. We have no glue fears now, because we know that every lot we get is prepared for our own use, and that the quality is the same in every instance."

"That's all right," I replied, "but having your confidence are you not afraid the manufacturer may ship you an inferior grade?"

I can still see his smile as he said, "No, we've got him tied up with a contract. You see it's this way—the glue man puts in the special equipment and demonstrates the efficiency of his goods on condition that if it proves satisfactory we use his product for a term of years. The contract at first looks like a mighty good thing for the glue manufacturer, and it is, but it also is a very good thing for us because in order to make it effective he has to make good all the time. So we are protected by the agreement."

"Then at the end of your present contract you think you will renew it?" I asked.

"I should say we will," he said with much emphasis. "As long as the manufacturer guarantees to protect us we will show our appreciation by using his product."

That in substance is what I gleaned from my first visit in a vegetable glue room. Later in Chicago I called on a manufacturer of doors that are used in hotel and office buildings all over the country, and informed an officer of the company that I was interested in vegetable glue. I

[fol. 723] got about the same information that is above recorded but his first words were, "Well, we use it, and we even go so far as to use it in our automatic glue jointing machine."

One hot day last June I had a visit with the president of one of the largest kitchen cabinet companies known, and in the course of conversation touched on the glue subject. He said:

"We use vegetable glue and it is a pleasure to go into our glue department now. I always used to avoid this department, especially, in the summer time, because the odor used to make me sick, but now I enjoy going there. Would you like to see it?"

The visit simply corroborated the evidence mentioned elsewhere in this article, with the additional emphasis on the lack of disagreeable odor one is so apt to find in places where animal glues are used.

"I understand that you are using vegetable glue in your panel work," was said to a well known Michigan manufacturer of parlor beds while making him a visit on September 8. "What do you think of it?"

Like a flash came the answer, "It's all right. The only one who can possibly have any objection to vegetable glue is the man who makes the other kind."

## Practical Demonstration

With his foreman I visited the department and learned that the work was given the same consideration that it had received when the other glues had been used. That is to say, the glued up material was left in the clamps and allowed to dry just as long, and not given any more attention than had been given to it under the old process. I was shown four panels under different tests. One was placed out doors where it could be reached by all the elements of the weather. One was in the lumber dry shed being subjected to the steaming and drying out process that the lumber was put through. One was in the varnish dry kiln where it suffered the changes from 115 degrees of heat to normal, and one was in the factory office where it could be under normal conditions. The four panels had been made

at the same time in an ordinary run of stock, and they had been in their respective places for six weeks when I saw them. So far as the eye could see the glue joints were the same in every case and no better joints could be desired. This foreman told me that he was saving at least twenty-five per cent of his former glue room costs and that he believed the annual saving would be even greater than that.

[fol. 724] On September 21 I called on C. H. McMillan, general manager of the Winnebago Furniture Manufacturing Company, Fond du Lac, Wisconsin. We were in the midst of a general conversation and he was looking over a copy of this periodical when he came to an advertisement.

"That's what we use here," he said.

"In your veneer work?" I asked.

"Yes, and everywhere else that we use glue. I know that the manufacturer is not strongly recommending its use for end joint work, but we do it and we are getting the results. We haven't any other kind of glue in the whole factory."

### The Courage of His Convictions

Much more was said which only confirmed the other evidence, and I asked if he had any objection to being quoted. He did not. He had the courage of his convictions and any one was welcome to his belief that he had a good thing. If they wanted to use it, well and good. If not, it was their business.

In marked contrast to this view was the attitude of a certain manufacturer of period and high grade furniture known for its quality from the East to the West. He admitted having used vegetable glue for some time and said that he would not go back to the use of animal glue. That he was saving money, and getting out as good a grade as ever, but he didn't believe in advertising the fact for the benefit of any competitors. I am not quite sure whether he meant his competitors would install the process if they knew he was using it, or knock his goods because they were manufactured where vegetable glue was used. In either case he need have no fear, for some of his competitors used this glue before he did, and it is a well known fact that you can usually afford to pay a man who knocks your goods.

Out of several other instances permit me to quote one more. In St. Louis, on September 22, the man I talked

with was the secretary of a large panel manufacturing company, whose products are used by the manufacturers of kitchen cabinets, case goods, beds, tables and other lines. This company has used vegetable glue for years and its product is going into all kinds of homes in all parts of the country, because it is used by manufacturers of all kinds of furniture. He told me one of his early troubles and how the glue manufacturers had stuck in the face of all kinds of discouragements until all the troubles had been solved so that now there was only one kind of glue for them. He cited the [fol. 725] instance of the receipt of a recent order in which the buyer had specified that vegetable glue was not to be used, but when he had been told of some of the manufacturers who were using it he came back with the order and said use vegetable glue.

From the foregoing it will be seen that the skeptic has built a house of cards, and they have fallen. It took time, but thanks to the perseverance of a few who had faith in the product and the pluck to fight an up-hill fight vegetable glue has passed from the experimental to the thoroughly practical state.

Perhaps a word of warning will not be out of place. There are always some who wait until a product has become a success so that people begin to use it with confidence, then they come forward with what is reputed to be as good a product for less money. Then there are those enemies of a product who see its popularity growing to the detriment of their own, who by surreptitious methods seek to tear down the confidence in the new product. Vegetable glue has both these conditions to contend with, and it will be well for the intending users to be very careful lest he fall into bad company and have his faith in a first class material absolutely destroyed.

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PLAINTIFF'S EXHIBIT 5, "VENEERS," OCTOBER, 1914, P. 12, LAST OF TWO PARAGRAPHS OF THE ARTICLE "ABOUT VENEER STAIN"

I recently met an eastern furniture manufacturer who has just returned from a trip to Grand Rapids, and who, by the way, was investigating vegetable glues; how they should be applied and what results manufacturers are

having, also what advantages if any, one gets from vegetable glues over hide and bone stock. The gentleman had with him a small panel veneered with birdseye maple veneer. He said, "See the stain?" I did observe it. "That is the only objection I have to vegetable glue." I asked him: "Did you find this to be a general trouble?" He replied that he did not. It seems to me that the proper parties to take this trouble up with would be the concern selling the glue. Vegetable glue has come to stay. There is no longer a question about this. Some manufacturers had trouble attending its initiatory use, but it must be remembered that these troubles were largely caused by ignorance of its characteristics and lack of intelligence in its application.

A glue salesman said to the writer a few days ago: "I do not know what we would have done if it were not for the fact that some of our trade is now buying vegetable [fol. 726] glue." The fast decreasing herds of cattle is causing a shortage in raw material from which animal glue is made. Prices are unsettled. The writer knows that a certain glue factory will not make contracts for any length of time, not knowing what it will have to pay for material. Most readers know that some of the large glue houses have advanced prices several times within the past two years. If your vegetable glue stains the veneer, it must be neutralized, and the manufacturer supplying the stock should be able to do so. In any event, take this question up with him. If he desires your business it is up to him to supply you with material that will do your work.

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PLAINTIFF'S EXHIBIT 6, "THE FURNITURE MANUFACTURER AND ARTISAN" SEPTEMBER, 1914, THE ARTICLE AT PAGE 133, "VEGETABLE GLUE HAS ARRIVED"

Although a Great Saving Can be Made by Its Use There are Manufacturers Who Refuse to Experiment and Investigate—Change Seems to be Coming

By G. D. Crain, Jr.

Those engaged in the woodworking field are sometimes accused of lacking that spirit of initiative which character-

izes metal workers—to take one field where progress has been marked along the lines of adoption of new machines and new methods as the years have rolled by. It must be admitted that there is something in the charge. For one thing, certain plants in the furniture business are operating with equipment that is practically obsolete, and yet manage to hold up their end in competition and to pay dividends to their stockholders. Evidently the general average of efficiency can not be high.

Unwillingness to adopt a new idea, or a new thing, until it has made good, is conservatism; and conservatism is a most useful and necessary qualification for the business man who would succeed. But unwillingness to try out the new idea is conservatism gone to seed. Instead of being useful and necessary, it is a positive handicap, introducing inertia and decay and dissolution. Some furniture manufacturers are conservative; others——

One splendid example of the ultra-conservatism, not anly of the furniture makers but of members of the woodworking trades generally, is furnished in the experiences of those who have been marketing vegetable glue for a number of years. There is no longer any question about the efficacy of this material, so that the statements which follow [fol. 727] may be made without any danger of controversy. It is now generally admitted, even by those who do not use vegetable glue, that it is all right, and that it has made good. The point is that it has taken many more years to accomplish this result than it should have taken.

The writer has been informed by those in a position to know that the vegetable glue manufacturers have always done everything in their power to safeguard the use of the material, and to insure the satisfaction of the user. They have stayed on the job until troubles which developed have been smoothed out, and until the whole system is working properly. They have backed up the assurance of the user to his customers with their guarantee, so that any losses which might have been suffered would not fall on the consumer alone; and yet, in spite of this attitude—this willingness to stand responsible for results—the originators of the idea found it amazingly difficult to get those who used glue in large quantities even to give it a trial.

The proposition had merit, and it has kept growing and kept making good with glue users, so that in the natural course of events top and panel manufacturers, furniture men and others in the business ultimately realized that vegetable glue was all right and would make a joint that would hold and would do the work required of it. But instead of the attitude of the glue buyer being one of interest—as it might have been, in view of the fact that the successful adoption of the material would practically cut his glue bills in two—it has always been one of decided indifference, and the vegetable glue man has had to fight to get the big buyer, as well as the little one, to give the proposition even causal consideration.

Of course, the furniture man who uses only a little glue, and who has equipment designed for the preparation of animal glue, may feel that with the small amount of gluing up that he has to do it would not be worth while to experiment, especially as the possible saving in his case would not be sufficiently great to form a very large inducement. As the old material is giving satisfaction, such a manufacturer may logically reason, there is no convincing argument in favor of throwing it out and putting in some other material, with an entirely different line of equipment and entirely new set of methods, all of which means a certain amount of difficulty because of the necessity of imparting much necessary information to employes who have that part of the work to handle.

[fol. 728] Such an attitude is understandable; but in the case of the concern which, say, is laying all its own veneers, doing an immense amount of gluing-up and spending thousands of dollars a year for glue, one would suppose that the chance to cut this bill in half would be sufficiently appealing to get action. But it has not usually been that way.

One of the best furniture manufacturers in the country, a man who has adopted a lot of splendid methods in the conduct of his plant has consistently refused to use vegetable glue.

"What do you think of vegetable glue?" he has been asked a number of times by people who regard his opinion as being worth more than the average.

"I am not using it, am I?" he has replied. "I could save a good many dollars a year by substituting it for the

glue I am using, and, inasmuch as I am continuing to use animal glue, that is pretty good evidence of what I think on the subject."

This manufacturer, it happens, has made a special study of animal glue. He is a close student of their grading, blending and handling, and gets remarkably good results with them. He has special testing equipment for determining whether any particular lot is up to his requirements, and his spreaders and other glue-room equipment are the latest and best. He has a considerable investment in machinery, while his investment in experience is correspondingly large. It is easy to understand that he leans toward animal glues because of the good result which he has learned how to get; but is it fair to his stockholders, to look at it merely from one standpoint, to refuse to consider the possibility of saving enough money to pay dividends on a good many shares?

If a lumberman were to come to this furniture manufacturer with a proposition which would result in his getting equally good stock for several dollars a thousand less than he is now paying, the chances are that he would at least look into the matter very thoroughly. If course it is not certain that he would accept it, because the dimension lumber people, who have an excellent proposition, and one that, judged from nearly evey point of view, is beneficial to the consumer, have had a hard row to hoe in educating the furniture trade in this direction. But that again suggests that there is too much willingness to stick to the old methods because they are old and without knowing that they are the best possible, and too great reluctance to discard those which have served their time and have been improved upon.

[fol. 729] The method used by a certain furniture concern which had been impressed by the advantages of using vegetable glue seems to be a sensible, fair one, and yet it is not used in regard to any problem of the factory nearly so often as it should be.

This house secured the names of the people who were using glue of that kind, and then sent one of its best men to each of them, securing a full report on their experiences, and describing exactly and in detail the methods that are used to insure proper results. The reports which it has

received have been very interesting, and have convinced the furniture company that it would be perfectly safe in making a change in its gluing system, and that it can hardly go wrong is indicated by the number and standing of the houses which are leading in the use of the vegetable variety.

One of the reasons which it might be thought would appeal with particular strength to the furniture manufacturer in this connection is the simplicity, relatively, with which vegetable glue may be used. There is no heating of the material necessary, and when it is remembered that a large percentage of the troubles arising from the failure of glued-up work to hold is due to using glue that has been heated to too great a temperature, this advantage looms up as one well worth considering. Then, too, animal glue frequently fails to give the best results because of the fact that it is allowed to cool off before the work gets into the presses. This is not the fault of the glue, of course, but it gives a chance to make mistakes that careless employes sometimes take advantage of.

There are numerous opportunities to introduce errors of omission and commission in making built-up stock, and the more of these opportunities the manufacturer eliminates, the better the work is going to be. No workman is infallible; and if the process of manufacture is simplified, the general average of his product is going to advance.

There are a great many glue-users who probably will never use anything but animal glue. This is all right, because animal glue is a valuable by-product of the beef, and it is thoroughly desirable that it be continued in use. But there are users of glue who could profitably introduce the use of the newer but equally effective vegetable product who are refusing to make the investigation which the proposition warrants. And there are others who have reached the turning of the way, and who, after having seen the favorable experiences of their neighbors in the trade, have [fol. 730] decided to try it out in their own plants.

Certainly an open mind is an asset to the head of a manufacturing plant, and those who refuse to open theirs to consider any proposition involving an alteration in their present methods of doing business are not going to progress very rapidly. And looking into the glue proposition is only one of numerous opportunities to forge ahead that some furniture manufacturers are refusing to take hold of.

PLAINTIFF'S EXHIBIT 7, TRADE PAPER "VENEERS," DATED SEPTEMBER, 1914, ARTICLE ON PAGES 18 AND 19, "CUTTING DOWN GLUE COST."

## Cutting Down Glue Costs

### By Junior Keller

A manufacturer of built-up stock, who believes in using a good grade of animal glue for all his work, has a superintendent who has come to the conclusion that on the cheaper kinds of work there is no logic in using as much glue or as good glue as when he is making expensive tops or panels. Consequently he has evolved a system which deserves attention, for it has proved an economy, as to glue without seriously hurting the quality of the work.

The plan is simplicity itself. It involves putting flour into the glue, and thus, without altering the consistency of the body, decreasing the proportion of glue which may be used. It would not do, obviously, to use too much water, as this would thin the material down to the point where it would not be able to do the work; but the use of the flour prevents it from getting too thin.

Then, on the other hand, flour itself has considerable value from the standpoint of viscosity. In the good old days of kite-flying, wasn't flour the chief element used in the manufacture of the paste which held those amateur airships together? Thus substituting flour for glue cannot be said to be taking away all of the qualities of the latter material, for flour supplies some of them, at all events.

The plant where this plan is being used is one of the best in the country, and the fact that it seriously considers reducing the cost of material in this way shows that the point is one worth attention. As suggested above, however, the flour mixture is not used on high grade stock, but on cheap work, where quality is not the main consideration, and where perfection to the extent of 100 per cent is not re- [fol. 731] quired, it works alright. In fact, the use of flour corresponds very closely to the use of silicate of soda in the cheap three-ply stock which is handled so largely nowadays, only the glue-flour mixture is probably a good deal better.

Some experience is needed, of course, to determine exactly the proper proportions of glue and flour to use. To put in too much will be disastrous; and it was stated that

one lot of built-up stock turned out badly just on this account. However, after a few experiments it will be found just how much flour the glue can stand without losing the margin of safety altogether. A concern which is using any considerable amount of glue would find this method an economy, but in the plant which does only a little gluing up, it would probably not be worth the trial, on account of the necessary risk involved.

In connection with saving money on glue, it must be admitted that the most practicable plan seems to be the use of vegetable glue. It is now generally conceded that it has made good and has come to stay, and the critics who formerly insisted that it would not fill the bill are now ready to admit that it will answer the purpose very well. And since the average plant can save 50 per cent of its glue appropriation by using the vegetable variety, it looks as though there is a mighty good argument in favor of this plan.

The splendid way in which vegetable glue houses have stood by their customers, literally "through thick and thin," is one of the reasons for their success, which seems now to be assured. The writer was told some time ago of the experience of a big panel factory which started using vegetable glue when it was much of an experiment, and of the troubles it had before it found exactly the right methods and the right combinations to produce perfect satisfaction. During the trials and tribulations that it met with, the glue house was right with it, and helped it to solve its problems, with the result that the panel manufacturer finally succeeded in getting the knowledge of the vegetable product which was all that was needed to insure complete success. Now, it goes without saying, nothing could induce him to use anything else.

[fol. 732] PLAINTIFF'S EXHIBIT 8, "CHICAGO MUSICAL TIMES," MARCH 9, 1910, ARTICLE ON PAGE 13, "PERKINS GLUE IS A GREAT SUCCESS"

## The Perkins Glue Is a Great Success

### Something Further About the Vegetable Glue Manufactured in South Bend, Ind.—The Advantages of a Cold, Thin Glue in Veneer Work—A Saving of Over 20 Per Cent in Cost

In the Musical Times of January 26, 1910, was published an account of a new thin glue that is being used in the great plant of the Singer Manufacturing Company in South Bend, Ind., with excellent results.

Alert piano manufacturers naturally read the facts with great interest and this office was immediately importuned for further particulars. In order to answer these various inquiries we again refer to the subject.

The glue is styled Perkins Glue—a purely vegetable glue manufactured by Frank G. Perkins in South Bend, Ind., by a secret process. It is made from the cactus plant and is sold to manufacturers in flake form. It is then mixed with a certain proportion of water and a chemical furnished for the purpose is added and this chemical causes the glue to come to a boil. It is then allowed to cool and is almost as thin as water. It can be spread cold and of course very thin, and requires but twenty-four hours, or even less, to dry.

In addition to the several other favorable points the item of saving is very marked—the manufacturers showing by conclusive proof that over 20 per cent in cost is saved by using vegetable glue. This makes a mighty strong showing as a matter of course.

For veneer work and all "building up" work those who use this glue say there is nothing like it in value—and the neatness and cleanness can easily be understood, for the disagreeable features attendant upon hot animal glue are entirely eliminated.

The company are largely extending their facilities and are thus in shape to take care of orders. Heretofore, their entire output has been taken by their old customers—con-

cern like the great sewing machine plant of the Singer Manufacturing Company. But the increased factory space makes it now possible to take on new business.

Manufacturers who are interested can learn all of the particulars by writing to the manufacturer, Frank G. Perkins, Dean Bldg., South Bend., Ind.

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[fol. 733] PLAINTIFF'S EXHIBIT 9, COPY OF "CHICAGO MUSICAL TIMES," JANUARY 26, 1910, ARTICLE AT PAGE 19, "NEW THIN GLUE INTERESTS PIANO MEN"

New Thin Glue Interests Piano Men

It is made in Florida from the Cactus Plant and is Almost as Thin as Water—Can be Piped to any Part of the Factory and Spread Cold—Singer Sewing Machine Plant at South Bend Uses it.

Up-to-date piano factory superintendents who are always on the lookout for features that will improve the product or facilitate the factory work are taking considerable interest in a glue which, it is said, is used exclusively at the big plant of the Singer Manufacturing Company, South Bend, Ind., where sewing machines are made by the thousands.

This glue is manufactured in Florida from the cactus plant and is sold to manufacturers in flake form. It is then mixed with a certain proportion of water and a chemical furnished for the purpose is added and this chemical causes the glue to come to a boil. It is then allowed to cool and is almost as thin as water. It can be spread cold and of course very thin, but it requires forty-eight hours to dry.

A foreman in a well known western piano factory was sent to South Bend by his employers to investigate the system of glueing used by the Singer Manufacturing Company. He returned very enthusiastic over the merits of this glue and claims that it will be a great boom to piano manufacturers as soon as the makers are able to increase their capacity sufficient to take on business of the piano trade. Just now it is said that the demand for the glue is so large that the company is unable to fill all orders, but

is increasing its manufacturing facilities as fast as possible. The glue is a comparatively new proposition, hence the inability of the makers to produce it in sufficient quantities at present.

According to the foreman who visited the Singer plant they mix this glue in a huge vat and pipe it to various parts of the factory. They do all their veneering with it and the Singer officials state that it is the biggest kind of a success. The cost of the glue is about the same as the old style animal glue though there will be a big saving it in its use because of the fact that so little is required to accomplish the result.

If this glue will do all that is claimed for it, it will certainly be a boon to piano manufacturers. It will do away with the ill-smelling and dirty glue pots and glue heaters [fol. 734] and will simplify the process of veneering to a wonderful degree. The many things in favor of the glue easily more than counter-balance the one drawback in the matter of slow drying. As long as the glue after being properly mixed is kept in pots or vats or other receptacles it will not dry and will last practically unlimited time or at least its consistency will not be changed for weeks and of course it can be mixed in as small quantities as desired so that there need be no fear of waste because of its drying in bulk.

[fols. 735 & 736] (Here insert three photographs, Plaintiff's Exhibits 10, 11, 12 in Solva case)

[fol. 737] PLAINTIFF'S EXHIBIT 79

## Process Record

Tank No. Record of Lot 25 Date Received

Gross amount from warehouse Kind
Estimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

### Treated as Below

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 7 | | Drew off 9-11A | 10/21 | Washed & filled | |
| " " 5 | | Partly filled 9-A | 10/21 | Stirrer on | |
| " " 5 | | Drew off | 10/25 | | |
| " " 5 | | Partly filled 4 P | 11/1/04 & stirred 9½° | | |
| " " 5 | | Pumped to 13 7-10A | 11/2 | 9½° | |
| " " 5 | | Ammonia 2 gal 7 A | 11/2 | Neutralized 9½° | |
| " " 7 | | Drew off 5:30 P | 11/2 | Refilled & stirrer on | |
| " " 7 | | Pumped to 13 A | 11/4 & tabled | | |
| " " 7 | | Threw to #1 from tables | 11/7 & mixed | | |
| " " 7 | | Tabled 2nd time | 11/8 | | |

Pumped to tank No. 5 Date 11/2/04
Tabled #5 11/2/04 Tabled in about 4½ hrs.
#7 11/4/04-11/8/04 second time
Into Kilns #5 11/3/04
#7 11/9/04 Temp. 150
Dumped to hoppers #5-11/7/04
#7-11/14/04 Loss on lots 52 & 35-7
#5-11/12/04 #5-20517 20%
Packed date Lbs. Moisture
Viscosity, W. House sample By
Viscosity, Raw-Mat. sample By
Loss
Sold to

[fol. 738]

Plaintiff's Exhibit 79

Process Record—Continued

Tank No. Record of Lot 25 Date Received

Gross amount from warehouse Kind
Estimate of Sieve loss Net 22994#
Inches of liquor Density
When pumped into special dept.

## Treated as Below

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 5 Drew off | | 7 A | 10/10 | Filled & stirred | |
| " " $H_2SO_4$ 368# (1.6%) | | 9:30 A 10A | 10/10 | 14° | B. |
| " " 7 Filled & left stirring | | | 10/10 | | |
| 26498 7 $K_2Mn_2O_8$ 33 | | 3:30 P | 10/13 | 10° | B. |
| Tank No. 5 Drew off | | 9-11 A | 10/14 | Washed & filled | |
| " " 5 " " | | 9-A | 10/15 | " | " |
| " " 7 Let to settle | | 9-A after | " | $K_2Mn_2O_8$ on 10/13 | |
| " " 7 Drew off | | 9:30 A | 10/17 | 14° | B. |
| " " 7 $H_2SO_4$ 338 | | 3:30 P | " | " | |
| " " 7 Run short on | | 4 | P $H_2SO_4$ should been 1.6% | | |
| " " 5 Drew off & washed | | | 10/17 & filled | | |
| " " 5 " " " | | | 10/18 " | | |
| " " 7 Partly filled | | 4 P washed | 10/18 let to settle | | |
| Pumped to tank No. | | | Date | | |
| Centrifuged | | | | Temp. | |
| Into kilns | | | | | |
| Dumped to hoppers | | | | Moisture | |
| Packed, date | Lbs. | | | By | |
| Viscosity, W. house sample | | | | By | |
| Viscosity, raw-mat. sample | | | | | |
| Loss | | | | | |
| Sold to | | | | | |

[fol. 739]

Plaintiff's Exhibit 79

Process Record.

Re-mixed 8/10

Tank No. 7 Record of lot 25 Date resieved 8/12/04
22437 Gross amount from warehouse 220-29040 Kind Sago
Estimate of sieve loss 10% = 2904 Net 26136
22437 Inches of liquor 44 Density 11
When pumped into special dept.

Treated as Below

| | | | Lbs. | | | Time | Date | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22437 | | | | | | 10 A | 8/13 | | | | |
| Tank | No. 6 | Drew off | | | | | 8/15 | | | | |
| 22437 | " | CaOCL " | 240# | (2nd water) | | 10 A | 8/18 | | | | |
| 22437 | " | " " | 450# | (1st " ) | | 4 P | 8/20 | after | #3 | was | in |
| 44874 | " | " " | 450# | (2nd " ) | | 9 A | 8/23 | " | #3 | " | " |
| 44874 | " | Ca O Cl " | 450# | (1st " ) | | | | | | | |
| | " | " " | 450# | (2nd " ) | | 4 P | 8/27 | | | | |
| 44874 | 7 | " " | 160 | (1st " ) | | | | | | | |
| | | " | 160 | (2nd " ) | | | | | | | |
| | | " | 160 | (3rd " ) | | 2:15-2:40 | 9/15 | | 17°B. | | |
| | $H_2O_2$ | 647 | | | | | 9/21-22 | | | | |
| | Engine stopped repairs | | | | | 6:30 P. | 7:15 P. | | 10/8 | | 16°B. |
| 22994 | 5 | $K_2Mn_2O_8$ 1/8% | 28½# | | | | | | | | |

808

Pumped to tank No. Date
Centrifugled
Into kilns Temp.
Dumped to hoppers
Packed, date Lbs. Moisture
Viscosity, W. house sample By
Viscosity, raw-mat. sample By
Loss
Sold to

[fol. 740] Plaintiff's Exhibit 79

Process Record

Re-mixed 8/13

Tank No. 7 Record of lot 26 Date resieved 8/15
22437 Gross amount from warehouse 221=29172 Kind Sago
Estimate of sieve loss 10% = 2917 Net 26155
22437 Inches of liquor 44 Density 11
When pumped into special dept.

Treated as Below

Lbs. Time Date Temp. Dens.

Tank No. 3 Drew off 8/19 & stirred
Combined with Lot 25—tank 6—8/20

Pumped to tank No. Date
Centrifugled
Into kilns Temp.
Dumped to hoppers
Packed date Lbs. Moisture
Viscosity, W. House sample By
Viscosity, Raw-mat. sample By
Loss
Sold to

Plaintiff's Exhibit 79

Finished Dry Test:

Lot #25
From Lab kiln Date, 10/19/04
Moisture
Method of test D. J.
Ratio of test 10 ozs.: 1 gal.
Viscosity 17-17
Color yellow Reaction neutral
Body good Dirt some dirt
Condition when cold liquid Dissolving O. K.
Condition cold after 72 hours

Notes on Wet Test:
Notes on Dry Test:

10# sample tank 5 neut. with bicarb. soda

[fol. 741] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date, 10/19/04

Wet Test from Process

From Lab. sample Tank No. Amt.

| | | |
|---|---|---|
| Method of test | D. J. | |
| Ratio of test | 10 oz. | |
| Viscosity | 30-30 | |
| Color | O. K. | Reaction neutral |
| Condition when cold | O. K. liquid | Dirt O. K. |
| Condition cold after 72 hours | | Diss. Fair |

Plaintiff's Exhibit 79

Finished Dry Test:

25

From Lab. sample Date, 10/19/04

Moisture

| | | |
|---|---|---|
| Method of test | D. J. | |
| Ratio of test | 10 ozs.: 1 gal. | |
| Viscosity | 27-27 | |
| Color good | Reaction very slightly acid | |
| Body O. K. | Dirt fair | |
| Condition when cold liquid | Dissolving some grit | |
| Condition cold after 72 hours | | |

Notes on wet Test:

Notes on Dry Test:

5# sample from tank 7 drained & dried on 10/7/04

[fol. 742] Plaintiff's Exhibit 79

Finished Dry Test:

Lot 25
From Lab. Kiln Date, 10/22/04

Moisture
Method of test D. J.
Ratio of test 10 ozs.: 1 gal.
Viscosity 25-24-24
Color O. K. Reaction very slightly acid
Body O. K. Dirt O. K.
Condition when cold Dissolving very good
Condition cold after 72 hours

Notes on Wet Test:

Notes on Wet Test:

Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date

Wet Test from Process:

From Tank No. Amt.

Method of test
Ratio of test
Viscosity
Color Reaction
Condition when cold Dirt
Condition cold after 72 hours

Finished Dry Test:

From Tank 6 Date, 8/20/04

Moisture
Method of test D. J.
Ratio of test 10 ozs.: 1 gal.
Viscosity 25-25
Color O. K. in spot plate Reaction neutral

Body fair — Dirt O. K.
Condition when cold solid — Dissolving not good
Condition cold after 72 hours solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 743] Plaintiff's Exhibit 79

Test Department

Lot No. 25 — Date

Wet Test from Process:

From — Tank No. — Amt.

Method of test
Ratio of test
Viscosity
Color — Reaction
Condition when cold — Dirt
Condition cold after 72 hours

Finished Dry Test:

From Tank 6 — Date, 8/24 04

Moisture
Method of test — D. J.
Ratio of test — 10 ozs.: 1 gal.
Viscosity to many floating drugs
Color dirty — Reaction neutral
Body O. K. — Dirt full of dirt, not bleached
Condition when cold — Dissolving not good
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

[fol. 744] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date, 8/24/04

Wet Test from Process:

From Tank 6 Tank No. Amt.

Method of test L. S.
Ratio of test 3° B.
Viscosity 29-29
Color O. K. Reaction neutral
Condition when cold solid Dirt O. K.
Condition cold after 72 hours solid

Finished Dry Test:

From Date

Moisture
Method of test
Ratio of test
Viscosity
Color Reaction
Body Dirt
Condition when cold Dissolving
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

[fol. 745] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date, 8/25/04

Wet Test from Process:

From Tank 6 Tank No. Amt.

Method of test L. S.
Ratio of test 3° B.
Viscosity 21-21 jelat 68° C

Color O. K. Reaction neutral
Condition when cold livery Dirt O. K.
Condition cold after 72 hours livery

Finished Dry Test:

From Date

Moisture
Method of test T hIz
Ratio of test
Viscosity
Color Reaction
Body Dirt
Condition when cold Dissolving
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

[fol. 746] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date,

Wet Test from Process:

From Tank No. Amt.

Method of test
Ratio of test
Viscosity
Color Reaction
Condition when cold Dirt
Condition cold after 72 hours

Finished Dry Test:

From Tank 6 dried in Lab. kiln Date, 8/25/04

Moisture
Method of test D. J.
Ratio of test 10 ozs.: 1 gal.
Viscosity 45-45

Color yellowish — Reaction neutral
Body O. K. — Dirt O. K.
Condition when cold solid — Dissolving fair
Condition cold after 72 hours solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 747] Plaintiff's Exhibit 79

Test Department

Lot No. 25 — Date 8/25/04

Wet Test from Process:

From Tank 7 — Tank No. — Amt.

Method of test — L. S.
Ratio of test — 3° B.
Viscosity 29-29 jelat 67° C
Color O. K. — Reaction neutral
Condition when cold solid — Dirt O. K.
Condition cold after 72 hours solid

Finished Dry Test:

From — Date.

Moisture
Method of test
Ratio of test
Viscosity
Color — Reaction
Body — Dirt
Condition when cold — Dissolving
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

[fol. 748] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date, 8/25/04

Wet Test from Process:

From 6-7 Tank No. Amt.

| | |
|---|---|
| Method of test | L. S. |
| Ratio of test | 3° B. |
| Viscosity | 33-34 jelat 66° C. |
| Color slightly yel in spot plate Reaction neutral | |
| Condition when cold | solid Dirt O. K. |
| Condition cold after 72 hours | solid |

Finished Dry Test:

From Date,

| | |
|---|---|
| Moisture | |
| Method of test | |
| Ratio of test | |
| Viscosity | |
| Color | Reaction |
| Body | Dirt |
| Condition when cold | Dissolving |
| Condition cold after 72 hours | |

Notes on Wet Test:

Notes on Dry Test:

[fol. 749] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date,

Wet Test from Process:

From Tank No. Amt.

| | |
|---|---|
| Method of test | |
| Ratio of test | |
| Viscosity | |

Color Reaction
Condition when cold Dirt
Condition cold after 72 hours

Finished Dry Test:

From Tank 7 dried in Lab. Kiln Date, 9/1/04

Moisture
Method of test L. S.
Ratio of test 10 ozs.: 1 gal.
Viscosity 22-22, jelat 78° C.
Color slight yellow Reaction
Body good Dirt O. K.
Condition when cold livery Disolving fair
Condition cold after 72 hours livery

Notes on Wet Test:

Notes on Dry Test:

[fol. 750] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date,

Wet Test from Process:

From Tank No. Amt.

Method of test
Ratio of test
Viscosity
Color Reaction
Condition when cold Dirt
Condition cold after 72 hours

Finished Dry Test:

From Lab. Kiln Date, 9/17/04

Moisture
Method of test L. S.
Ratio of test 10 ozs: 1 gal.
Viscosity 39-4243, jelat 75° C.

| | |
|---|---|
| Color yellowish | Reaction neutral |
| Body good | Dirt O. K. |
| Condition when cold liquid | Dissolving some grit |
| Condition cold after 72 hours | solid |

Notes on Wet Test:

Notes on Dry Test:

[fol. 751] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date,

Wet Test from Process:

From Tank No. Amt.

| | |
|---|---|
| Method of test | |
| Ratio of test | |
| Viscosity | |
| Color | Reaction |
| Condition when cold | Dirt |
| Condition cold after 72 hours | |

Finished Dry Test:

From Lab. Kiln Date, 9/15/04

| | |
|---|---|
| Moisture | |
| Method of test | L. S. |
| Ratio of test | 3° B. |
| Viscosity | 35-35. jelat 67° C. |
| Color slight yellow | Reaction acid |
| Body good | Dirt O. K. |

Condition when cold liquid dissolving—fair some grit
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

[fol. 752] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date,

Wet Test from Process:

From Tank No. Amt.

Method of test
Ratio of test
Viscosity
Color Reaction
Condition when cold Dirt
Condition cold after 72 hours

Finished Dry Test:

From Lab. Kiln Date, 9/23/04

Moisture
Method of test L. S.
Ratio of test 10 ozs.: 1 gal.
Viscosity 25-25 jelat 75° C.
Color yellowish Reaction neutral
Body good Dirt O. K.
Condition when cold liquid. Dissolving some grit
Condition cold after 72 hours Solid

Notes on Wet Test:

Notes on Dry Test:

10# sample taken from tank 7 dried in Lab. Kiln.

[fol. 753] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date,

Wet Test from Process:

From Tank No. Amt.

Method of test
Ratio of test

Viscosity
Color Reaction
Condition when cold Dirt
Condition cold after 72 hours

Finished Dry Test:

From Lab. Kiln Date, 10/8/04

Moisture
Method of test D. J.
Ratio of test 10 ozs.: 1 gal.
Viscosity 52-54-55
Color O. K. Reaction neutral
Body O. K. Dirt O. K.
Condition when cold livery Dissolving fair
Condition cold after 72 hours solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 754] Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date, 10 14 04

Wet Test from Process:

From Tank 5 Tank No. Amt.

Method of test L. S.
Ratio of test 10:1
Viscosity 16-16
Color Yellow Reaction neutral
Condition when cold liquid Dirt O. K.
Condition cold after 72 hours livery

Finished Dry Test:

From Date,

Moisture
Method of test
Ratio of test

| | |
|---|---|
| Viscosity | |
| Color | Reaction |
| Body | Dirt |
| Condition when cold | Dissolving |
| Condition cold after 72 hours | |

Notes on Wet Test:

1 gal. neut. with bicarb. soda

Notes on Dry Test:

[fol. 755] Plaintiff's Exhibit 79

Test Department

Lot No. 25-5 Date, 11/12/04

[Wet Test from Process:¡* Dry

From W. H. Tank No. Amt.

| | | | |
|---|---|---|---|
| Method of test | D. J. | | |
| Ratio of test | 10 oz.: 1 gal. | | |
| Viscosity | 21-21 | | |
| Color | O. K. | Reaction | Neutral |
| Body | O. K. | | |
| Condition when cold | | Dirt | Some |
| Condition cold after 72 hours | | Diss. | Fair |

[*Erased in copy.]

Plaintiff's Exhibit 79

Test Department

Lot No. 25-7 Date, 11/12/04

[Wet Test from Process:]* Dry

| From Racks | | Tank No. | Amt. |
|---|---|---|---|
| Method of Test | D. J. | | |
| Ratio of test | 23-23 | | |
| Viscosity | O. K. | | |
| Color | O. K. | Reaction | Neutral |
| Body | O. K. | | |
| Condition when cold | | Dirt | Some |
| Condition cold after 72 hours | | Diss. | Fair |

Plaintiff's Exhibit 79

Finished Dry Test:

Tank Report

Lot No. 25

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Tank No. | 7 | Inches | 44 | Density | 11 | Date | 6/12/04 |
| " | 5 | " | 31 | " | 16 | " | 10/9/04 |
| " | ..... | " | ..... | " | ..... | " | ..... |
| " | ..... | " | ..... | " | ..... | " | ..... |
| " | ..... | " | ..... | " | ..... | " | ..... |
| " | ..... | " | ..... | " | ..... | " | ..... |

—— ——, Tank Foreman.

[*Erased in copy.]

[fol. 756] Plaintiff's Exhibit 79

Process Record

Tank No. 1 Record of Lot 35 Date received Oct. 12—

Gross amount from warehouse not weighed Kind sweepings

Estimate of sieve loss——— Net———

20862# Inches of liquor 45 Density 10°

When pumped into special dept.

Treated as Below

| | | | | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|---|---|---|
| | Tank No. | 4 | Drew off filled | | 6:30-8 A | 10/13 & washed 10/14 | | |
| 5894# | " | " 10 | H. C. L. | 147# | 12:45 A | 10/15 | | 17° B. |
| | | | $H_2SO_4$ | 29# | 2:10 P | " " | | " " |
| 12294# | " | " 11 | H. C. L. | 307# | 1:30 P | 10/15 | | 15½° |
| | | | $H_2SO_4$ | 61# | 2:30 P | " " | | |

825

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | Tank No. | 3 | Pumped to #3 | 8:30-11:30 A | 10/16 equal amt. of water added | |
| 3 | " " | 3 | Bicarb. 250# | 8:00-A. 10 A | 10/20 neutralized | 8½° B. |
| | " | | | | | |
| | " | | | | | |
| | " | | | | | |
| | " | | | | | |

Pumped to Tank No. 13 Date 10/20/04.
Tabled 10/20/04
Into Kilns 10/22/04 Temp. 160° F.
10/26
Dumped to Hoppers Mixed with lot 37 to make #41
Packed, Date 10/26 Lbs. Moisture
Viscosity, W. House Sample By
Viscosity, Raw-Mat. Sample By
Loss
Sold to

[fol. 757] Plaintiff's Exhibit 79

Test Department

Lot No. 35 Date 9/4/07 Time 8 a. m.

From warehouse sample Method of Test L. S.
Ratio of test 10 oz.: 1 gal. $H_2O$ Viscosity 18 & 18
Color milky Dirt very little
Reaction neut. to Pheno. & Methlo.
Body Dissolving readily
Condition when cold After hrs.
Neutralized with To
Notes:

Plaintiff's Exhibit 79

Test Department

Lot No. 25 Date 9/3/07 Time 5:15 p. m.

From warehouse sample in lab. Method of test L. S.
Ratio of test 10 oz. S to 1 gal. $H_2O$ Viscosity 16½ & 16½
Color thin milky Dirt some
Realtion neut. to Pheno &Methlo
Body Dissolving readily
Condition when cold After hrs.
Neutralized with To
Notes: Viscosimeter samp. half way between 16 & 17 3 times in succession

[fol. 758] Plaintiff's Exhibit 79

Test Department

25-5 & 25-7
Lot No. 25 Date 10/19/04 Time

From Lab. kiln Method of test
Ratio of test 10 oz.: 1 gal. == Viscosity 17-17
W-H = 21-21 same
" " 23-23 "
25-5 & 25-7
Color Dirt
Reaction neutral
Body Dissolving

Condition when cold After hrs.
Neutralized with To
Notes:

Plaintiff's Exhibit 79

Test Department

Lot No. 35 Date, 10/16/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.
Method of test L. S.
Ratio of test 9:1
Viscosity 17-17
Corn yellow Reaction neutral
Condition when cold liquid Dirt some dirt
Condition cold after 72 hours solid

Finished Dry Test:

From Date
Moisture
Method of test
Ratio of test
Viscosity
Color Reaction
Body Dirt
Condition when cold Dissolving
Condition cold after 72 hours

Notes on Wet Test:

1 gal. neut. with Na O. H.

Notes on Dry Test:

Plaintiff's Exhibit 79

## Process Record

Tank No. 10 & 11 Record of lot 38 Date 10/17/04

Gross amount from warehouse 17,520 Kind Lot 23

Estimate of sieve loss Net 17,520

16,907# = 10 & 11

Inches of liquor Density

When pumped into special dept.

Treated as Below:

| | | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|---|
| Tank No. 10 | | | | | | |
| 4,987 | H. C. L. 2½ | 124½# | 2:30P. | 10/17 | | 14° B. |
| | $H_2SO_4$ ½ | 25# | 3:00P. | " " | | " |
| 11,920 11 | H. C. L. 2½ | 298# | 5:30P. | 10/17 | | 16° B. |
| | $H_2SO_4$ ½ | 60# | 6:30P. | " " | | " |
| 10 & 11 | Heat on | | 6:30P. | 10/17 | Heater 52 C. | |
| | Heat off | | 3:30P. | | Heater 52 C. | |
| | | | | 10/18 | Tanks 50 C. | |
| | Dropped to #2 | | 3P-5P | 10/18 | tank filled water | |
| | Drew off | | 3P. | 10/20 | filled and washed | |
| | " " | | 3P. | 10/22 | " " | |
| | " " | | 8A. | 10/24 | & stirred | |

51—285

828

| | | | |
|---|---|---|---|
| | Na O H 10# | 9A. | 10/24 neutralized |
| 15,321 | Pumped to tank No. 13 Date 10/24/04 | | |
| | Tabled 10/24/04 | | |
| #38–17,520 | Into Kilns 10/25/04 Temp. 160° F. | | |
| #39–13,758 | Dumped to hoppers 10/28/04 | | |
| Tot. 31,278# | Packed, date See #43 Lbs. Moisture | | |
| | Viscosity, W. House sample By | | |
| #38–15,321 | Viscosity, Raw-Mat, sample By | | |
| #39–12,172 | Loss | | |
| Tot. 27,493 | Sold to | | |

[fol. 760] Plaintiff's Exhibit 79

Test Department

Lot No. 38 Date, 10/18/04

7 a. m.

Wet Test from Process:

From tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 31-33
Color yellow Reaction neutral
Condition when cold solid pan Dirt O. K.
Condition cold after 72 hours solid
1 gal. neut. with soda bicarb.

Plaintiff's Exhibit 79

Test Department

Lot No. 38 Date, 10/18/04

7 a. m.

Wet Test from Process:

From tank 10-11 1 P. Tank No. Amt.

Method of test L. S.
Ratio of test 9:1
Viscosity 16-17-17
Color yellow Reaction neutral
Condition when cold liquid tube Dirt O. K.
Condition cold after 72 hours livery
1 gal neut. with soda bicarb.

[fol. 761] Plaintiff's Exhibit 79

Test Department

Lot No. 38 Date, 10/18/04

Wet Test from Process:

From tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 20-20-19
Color yellow Reaction neutral
Condition when cold solid pan Dirt O. K.
Condition cold after 72 hours solid
1 gal. neut. with bicarb. soda.

Plaintiff's Exhibit 79

Test Department

Lot No. 38 Date, 10 18 04

Wet Test from Process:

From tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 18-18
Color yellow Reaction neutral
Condition when cold solid pan Dirt O. K.
Condition cold after 72 hours solid
1 gal. neut. with bicarb. soda

[fol. 762] Plaintiff's Exhibit 79

Test Department

Lot No. 38 Date, 10/18/04

Wet Test from Process:

From tank 10-11 11:30 A. Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 23-23
Color yellow Reaction neutral
Condition when cold solid pan Dirt O. K.
Condition cold after 72 hours solid
1 gal. neut. with Na O H

Plaintiff's Exhibit 79

Finished Dry Test:

From Lab. kiln Date, 10/19/04

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 26-27-27
Color yellow Reaction neutral
Body good Dirt O. K.
Condition when cold Dissolving fair
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

Sample taken end of 12 hrs. treatment.

[fol. 763] Plaintiff's Exhibit 79

Finished Dry Test:

#30

From Lab. kiln — Date, 10/19/04

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 18-18
Color yellow — Reaction neutral
Body fair — Dirt O. K.
Condition when cold — Dissolving fair
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

10# tank 10-11 neut. with bicarb. soda was taken at 9a. 10/18

Plaintiff's Exhibit 79

Test Department

Lot No. 38 — Date, 10/18/04

Wet Test from Process:

From E. Rax — Tank No. — Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 23-23
Color yellow — Reaction neut.
Condition when cold good
solid — Dirt fair
Condition cold after 72 hours — Diss. very good

[fol. 764] Plaintiff's Exhibit 79

Treated as Below:

| | Lbs. | Time | Date | Depth | Dens. |
|---|---|---|---|---|---|
| Tank No. 10 | 4,987 | 3:20 P. | 10/17/04 | 75 in. | 14° B. |
| " " 11 | 11,920 | 5:30 | 10/17/04 | 57 | 16 |
| " " 2 | 15,321 | 1:00 P. | 10/24/04 | 39 | 8½ |
| Lot #38 | | | | | |
| =38 | | | | | |

Plaintiff's Exhibit 79

Finished Dry Test:

From Racks Date, 11/3/04

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 23-23
Color yellow Reaction neutral
Body good Dirt fair
Condition when cold Dissolving fair
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

[fol. 765]

Plaintiff's Exhibit 79

## Process Record

Tank No. 1 Record of lot 39
Actual Gross amount from warehouse
#13 — 6750
18 — 2130 Estimate of sieve loss
# 4 — 3928
#16 770 Inches of liquor 17

13578#
into When pumped into special dept. process 10/19/04

Date 10/19/04
Kind Lot 18 W-H
" 13 "
Tank 16 Lot 31 tails
" 4 " 38 left over
Density 15¼ net 13578#

### Treated as Below:

| | | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|---|
| Tank No. 10 | H. C. L. | 74# | 1:30 P. | 10/19 | | 14° B. |
| 3857 | $H_2SO_4$ | 15# | 2:00 P. | " " | | " |
| 11 | H. C. L. | 148# | 2:00 P. | 10/10 | | 14° B. |
| 8977 | $H_2SO_4$ | 29# | 2:30 P. | 10/19 | | " |
| 10 | H. C. L. | 38½# | 7:15 A. | "/21 | | 13° B. |
| 11 | H. C. L. | 89½# | " | " | | 13° B. |

10 & 11 { Heat started 1:40 P. / " stopped 5:30 P. / " Started 8: A. / " stopped 5:30 P. / " started 6:35 A. / " stopped 5:30 P.

#4 Pumped to #4 8A-10A

Pumped to tank No. Date

Centrifugled

Into kilns Temp.

Dumped to hoppers

Packed date Lbs. Moisture

Viscosity, W. house sample By

Viscosity, raw-mat. sample By

Loss

Sold to

10/19 Heater 52 C.
" 54 C.

10/21 Heater 54 C.
" " Tanks 51 C.

10/22 Heater 56 C.
" " Tanks 53 C.

10/24 filled and let settle

[fol. 766] Plaintiff's Exhibit 79

Process Record

Tank No. 4 Record of lot 39 (Continued) Date 10-19-04
Gross amount from warehouse Kind
Estimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

Treated as Below:

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 4 Drew off | | 4:30 A. | 10/26 | | |
| Stirred up | | 6:30 " | " | | |
| Soda Bi-Cb | 220# | 8:30 | " | Neutralized | |

12172# Pumped to tank No. 13 Date 10/26/24
Tabled 10/26/04
Into kilns 10/28/04 Temp. 160°
Dumped to hoppers 10/31
Packed, date see #43 Lbs. Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Loss
Sold to

[fol. 767] Plaintiff's Exhibit 79

#39.

Finished Dry Test:

From Racks Date, 11/3/04
Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 20-20
Color yellow Reaction neutral
Body good Dirt some dirt
Condition when cold solid "Pan" 30 min. Dissolving O. K.
Condition cold after 72 hours.

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Treated as Below:

| | Lbs. | Time | Date | Depth. | Dens. |
|---|---|---|---|---|---|
| Tank No. 1 | 12195# | 10:15 A | 10/19 | 17 in. | 15-1/4 °B |
| " " 4 | 3928 | 9 A | 10/19 | 10 in. | 8-1/2 |
| " " 10 | 3857 | 12:50 | 10/19 | 58 in. | 14° B |
| " " 16 | 770 | 9:30 A | 10/19 | 39 in. | 4° B |
| " " 11 | 8977 | 12:50 | 10/19 | 50 in. | 14° B |
| " " 4 | 12172# | 7:35 A | 10/26 | 32 in. | 8° B |

Lot #39

[fol. 768] Plaintiff's Exhibit 79

Test Department

Lot No. 39 4-P. M. Date, 10/19/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity too thick to test
Color brown Reaction neutral
Condition when cold solid Dirt fair
Condition cold after 72 hours
1 gal. neut. with bi-carbonate soda

Plaintiff's Exhibit 79

Test Department

Lot No. 39 7 A Date, 10/20/04

West Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 23-23
Color brown Reaction neutral
Condition when cold solid Dirt O. K.
Condition cold after 72 hours
1 gal. neut. with bi-carbon. soda

[fol. 769] Plaintiff's Exhibit 79

Test Department

Lot No. 39 10:45 A Date, 10/20/04

Wet Test from Process:

From tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 25-26-26
Color brown Reaction neutral
Condition when cold solid Dirt O. K.
Condition cold after 72 hours
1 gal, neut. with bi-carb.

Plaintiff's Exhibit 79

Test Department

Lot. No. 39 2:30 P. Date, 10/20/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 23-23
Color yellow Reaction neutral
Condition when cold solid Dirt O. K.
Condition cold after 72 hours
1 gal. neut. with Na O.H

[fol. 770] Plaintiff's Exhibit 79

Test Department

Lot No. 39 5:30 P. Date, 10/20/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 19-19
Color brown Reaction neutral
Condition when cold solid Dirt fair
Condition cold after 72 hours
1 Gal neut with Na O.H.

Plaintiff's Exhibit 79

Test Department

Lot No. 39 A A Date, 10/21/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 19-19
Color brown Reaction neutral
Condition when cold solid spot plate Dirt fair
Condition cold after 72 hours
1 gal. neut. with Na O.H.

[fol. 771] Plaintiff's Exhibit 79

Test Department

Lot No. 39 11 A Date, 10/21/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 18-18
Color brown Reaction neutral
Condition when cold solid Dirt fair
Condition cold after 72 hours
1 gal. neut. with Na O.H.

Plaintiff's Exhibit 79

Test Department

Lot No. 39 3 P. Date, 10/21/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 18-18
Color brown Reaction neutral
Condition when cold solid Dirt O. K.
Condition cold after 72 hours
1 gal. neut. with Na O.H.

[fol. 772] Plaintiff's Exhibit 79

Test Department

Lot No. 39 5 P. Date, 10/21/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 18-18
Color brown Reaction neutral
Condition when cold solid Dirt fair
Condition cold after 72 hours
1 gal. neut. with Na O.H.

Plaintiff's Exhibit 79

Test Department

Lot No. 39 6:30 A. Date, 10/22/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 17-17
Color yellow Reaction neutral
Condition when cold liquid after 5 hrs. in pan
Dirt fair
Condition cold after 72 hours
1 gal. neut. with carbonate soda.

[fol. 773] Plaintiff's Exhibit 79

Test Department

Lot No. 39 8 A. Date, 10/22/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 17-17
Color brown Reaction neutral
Condition when cold solid pan after 3 hrs.
Dirt O. K.
Condition cold after 72 hours
1 gal. neut. with Na O.H.

Plaintiff's Exhibit 79

Test Department

Lot No. 39 12:30 P. Date, 10/22/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 17-17
Color brown Reaction neutral
Condition when cold solid Dirt
Condition cold after 72 hours
1 gal. neut. with Na O.H.

[fol. 774] Plaintiff's Exhibit 79

Test Department

Lot No. 39 2:30 P. Date, 10/22/04

Wet Test from Process:

From Crock 7 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 18-18
Color yellow Reaction neutral
Condition when cold solid pan Dirt O. K.
Condition cold after 72 hours
2 gal. liquor from tank 10-11 washed out acid in 3 washing sample drawn at 9:30 A.

Plaintiff's Exhibit 79

Test Department

Lot No. 39 5 P. Date, 10/22/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 17-17
Color brown Reaction neut.
Condition when cold solid Dirt fair
Condition cold after 72 hours
1 gal. neut. with carbonate soda

[fol. 775] Plaintiff's Exhibit 79

Test Department

Lot No. 39 7:25 A Date, 10/24/04

Wet Test from Process:

From Tank 10-11 Tank No. Amt.

Method of test L. S.
Ratio of test 4:1
Viscosity 17-17
Color brown Reaction neutral
Condition when cold solid Dirt fair
Condition cold after 72 hours
1 gal. neut. with carbonate soda

Plaintiff's Exhibit 79

Finished Test

From Lab. kiln — Date, 10/29/04

Moisture

Method of test L. S.

Ratio of test 4:1

Viscosity 17-17

Color yellow — Reaction neutral

Body good — Dirt fair

Condition when cold liquid, solid after 5 hrs.

Dissolving O. K.

Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

10# from tables dried in lab.

[fol. 776] Plaintiff's Exhibit 79

Process-Record — Lots 34-35-36-37-41-42

30 Tons

Tank No. 1 — Record of lot 42 — Date 10/27/04

Gross amount from warehouse 55 bags — Kind Lot 21

11149# Estimate of sieve loss — Net 13750

Inches of liquor 18½ — Density 13°

When pumped into special dept.

Treated as Below: — Wait for nips

| | Lbs. | Time |
|---|---|---|
| Tank No. 10. & 11 pumped to | | |
| " " Drew off | | 9 A |
| 10 H. C. L. (2%) | 60-½# | 3 P-4P |
| 3027# $H_2SO_4$ " | 60½# | " " |
| 9605 H. C. L. " | 192# | " " |
| $H_2SO_4$ " | 192# | " " |
| Heat on | | 4:30 P |
| " " at 60 C till 3 P | | |
| Tanks at 58 & 59 C with covers | | |
| Heat on again tanks 45 C 2 P | | |
| " off | | 11 A |
| Pumped to #4 | | 1 P 3 P |
| #4 drew off P | | |
| " A | | |
| " A | | |
| " A | | |
| #4 Chalk A | 60# | |
| 9829 stirred up A | | |
| Blue 1900 C. C. | | 7:30 |

Pumped to tank No. 13
Tabled 11/11/04
Into kilns 11/14/04
Dumped to hoppers 11/16/04
Packed, date 11/19/04 Lbs. 12009
Viscosity, W. house sample
Viscosity, Raw-mat. sample
Loss to dry tables following lot
Sold to H. D. Kendall—New York 11/19

| Date | Temp. | Dens. |
|---|---|---|
| 10/27 let settle | | |
| 10/31 & refilled | | 14°B |
| " | | " |
| " | | 14°B |
| " | | " |
| " | | 14°B |

" Heater up to 60 C
11/2 Pump stopped 3 P 1½
on both #11 hottest
11/3 Heater to 60 C
11/4 Tanks 59 C
11/4 filled & belt off
11/5 filled and washed
11/7 "
11/9 "
11/10 stirred up
11/10 neutralized
11/11
11/11 1-3 of 1 c. c. per
pound
Date 11/11/04

Temp. 160°F.

Moisture
By
By

[fol. 777] Plaintiff's Exhibit 79

Process-Record

Tank No. Record of Lot 43 Date Resieved
Gross amount from warehouse 31278 Kind 38 & 39
Estimate of sieve loss Not sieved Net 31278
Inches of liquor Density
When pumped into special dept.

Treated as Below

Lbs Time Date Temp. Dens.
Pumped to tank No. Date
Centrifugled
Into kilns Temp.
Dumped to hoppers
Packed, date 11 1 04 Lbs. 32480 Moisture Abt.
Viscosity, W. house sample 23-23 10-12%
By L. S. 4:1
Viscosity, Raw-mat. sample By
Loss None in either lot 38 or 39
Sold to P. M. Co. Boston Car #4

Plaintiff's Exhibit 79

Test Department

Lot No. 43 Date 11/3

Dry Test from Process:

From W. H. Sample Tank No. Amt.
Method of test L. S.
Ratio of test 4:1
Viscosity 23-23
Color yellow Reaction neut.
Body good
Condition when cold solid Dirt fair
Condition cold after 72 hours Diss. fair

[fol. 778] Plaintiff's Exhibit 79

Test Department

Lot No. 43 L Date 10/19

Dry Process:

From Lab. Kiln Tank No. Amt.
3% H. C. L.
Heat 55 C 2 hr
Method of test L. S.
Ratio of test 9:1
Viscosity 22-22
Color fair Reaction neutral
Body good Dirt fair
Condition when cold
Condition cold after 72 hours Diss. fair
For paper coating gum Too thin

Plaintiff's Exhibit 79

Finished Dry Test

#43

From W. H. Sample Date 11/3/04
Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 23-23
Color yellow Reaction neutral
Body good Dirt fair
Condition when cold solid "Pan" 30 min.
Dissolving fair
Condition cold after 72 hours.
Notes on Wet Test:
Notes on Dry Test:

[fol. 779] Plaintiff's Exhibit 79

Process Record 55-5

Tank No. 1 Record of Lot 50 Shipped as Lot 55-5
Date Resieved 11/19/04

Gross amount from warehouse 80-17240 Kind G T A
Estimate of sieve loss 12% = 1868# Net 15372
Inches of liquor Density
When pumped into special dept.

Treated as Below:

| | Lbs. | | Time | Date | Tempt. | Dens. |
|---|---|---|---|---|---|---|
| Tank No. 6 Drew off | | | 2 P | 11/23 | stirred up | 16¾ |
| 10 H. C. L. | 151 | 5% | 8-10 A | 11/24 | 142 | 5 |
| $H_2SO_4$ | 100 | | " | " | " | " |
| 11 H. C. L. | 310 | | " | " | 13 | |
| $H_2SO_4$ | 206 | | " | " | " | |
| | | | | No acid. Note result | | |
| Heat started | | | 6:30 P | 11/23 | Heater to 60° C | |
| " off | | | 8 A | 11/24 | gelatinized | |
| " on | | | 12 M | " | Heater to 58 C | |
| " off | | | 2 P | 11/25 | Tanks 56½° C | |

Filled & drew off while away
Carb. soda 125# = 8:30 A 12/3 neutralized
Lot 56 pumped to 13 with #50 12/3/04
Pumped to tank No. 13 Date 12/3/04
Tabled 12/3/04
Into kilns Temp.
Dumped to hoppers
Packed, date 12/13 Lbs. 20750 Moisture
Viscosity, W. House sample 30-30 By L. S. 4:1
Viscosity, Raw-mat. sample By
Loss Gain is from tank #3 & is resieving from tank #9
Sold to 30 Bags to R. M. Winans

[fol. 780] Plaintiff's Exhibit 79

Lot No. 50

Dry Test

A. W. H. Date 12/13/04

M of test L. S.
Ratio of test 4:1
V 29-29 Reaction acid
jelat. 67° C.
Color yellow Dirt fair
Body O. K. Dissolving fair

Plaintiff's Exhibit 79

Lot 50 Dry Test

Date 12/12/04

From W. H. Sample

M. of test L. S.
Ratio of test 4:1
Vi. 30-30 jelat. 70° C.

Color yellow Reaction acid
Body good Dirt fair
Dissolving fair

[fol. 781] Plaintiff's Exhibit 79

Finished Dry Test

Lot 50

From Lab. Kiln
Lot No. 50 Date 12/16/04
Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 52 53 jelat. 67° C
Color yellow Reaction slightly acid
Body O. K. Dirt O. K.
Condition when cold Dissolving fair
Condition cold after 72 hours.

Notes on Wet Test:

Notes on Dry Test:

2# from tables dried in kiln.

Plaintiff's Exhibit 79

Finished Dry Test

Lot 50
From Racks Date 12/12/04
Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 43-43 jelat. 70° C
Color yellow Reaction acid
Body O. K. Dirt fair
Condition when cold Dissolving fair
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

[fol. 782] Plaintiff's Exhibit 79

Treated as Below:

| | Lbs. | Time | Date | Depth. | Dens. |
|---|---|---|---|---|---|
| Tank No. 3 | | 8:30 A. | 12/3/04 | 16 in. | 7½° B |

Lot No. 56
Pumped to tank No. 13 Date 12/3/04

Plaintiff's Exhibit 79

Treated as Below:

| | Lbs. | Time | Date | Depth. | Dens. |
|---|---|---|---|---|---|
| Tank No. 4 | | 8:30 A | 12/3/04 | 33 in. | 7½°B |

Lot No. 50
Pumped to tank No. 13 Date 12/03/04

[fol. 783] Plaintiff's Exhibit 79

Process Record

55-5 Mixed with lot 50 and shipped as lot 50

Tank No. 5 Record of lot 56 Date Resieved

Gross amount from warehouse Kind Resieved
Estimate of Sieve loss Net Tank #9
Inches of liquor Density Pulp sieved out of raw material sieved over

When pumped into special dept.

Treated as Below:

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 3 Drew off | | | 12/2 | | |
| Stirred | | | 12/3 | | |

Carb soda 65# 8:30 A. 12/3 neutralized
Pumped to #13 with #50 same as Lot #55-5
Pumped to tank No. 13 Date 12/3/04
Tabled 12/3/04 as Lot 50
Into kilns Temp.
Dumped to hoppers
Packed, date See next attached Lbs. Moisture
Viscosity W. house sample see lot 55-5 next attached By

Viscosity, Raw-mat. sample By
Loss
Sold to

[fol. 784] Plaintiff's Exhibit 79

Process Record

Tank No. Record of Lot 58 Date Ground Jan 7th to 16th

Gross amount from cars etc. 77950# Kind ¼ Cass.
Estimate of sieve loss estimate 20% Net 15590
Inches of liquor Density
When pumped into special dept. Jan. 18th
Caustic 1 qt. per tank
Formaldehyde 1 qt. per tank

Treated as Below:

14347# 11 Tabled

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 2-3-4 & 7 | | | | | |
| | Pumped to 13 | | 11/17 & tabled | | |
| 14347 | 1 Tables to #1 | 6:30-2:30 P | 1/18 & to 10 & 11- | | 15-½°B |
| 4563 #10 H. C. L. | 137# | 9:45-10:45 P | " | | |
| " $H_2SO_4$ | 91# | " | " | | |
| #11 H. C. L. 5% | 283# | " | " | | |
| " $H_2SO_4$ | 189# | " | " | | |
| Heat on | | 10 P | 1/18 Heater to 60° C | | |
| " off | | 5:30 P | 1/20 Heater 60° Tanks 58 57½C | | |
| Dropped to #4 | | 7 A | 1/21 tank filled & stirred | | |
| Drew off | | " | 1/23 tank filled & washed | | |
| " " | | " | 1/25 tank filled & washed | | |
| " " | | " | 1/27 left 6" water | | |
| Stirred up | | " | " | | 140° |
| Pumped to tank No. | | | Date | | |
| Centrifugled | | | | | |
| Into kilns | | Temp. | | | |
| Dumped to hoppers | | | | | |
| Packed, date | | Lbs. | Moisture | | |
| Viscosity, W. House sample | | | By | | |
| Viscosity, Raw-mat. sample | | | By | | |
| Loss | | | | | |
| Sold to | | | | | |

[fol. 785] Plaintiff's Exhibit 79

Process Record (Continued)

Tank No. Record of lot 58 Date resieved
Gross amount from warehouse Kind
Estimate of sieve loss Net
Inches of liquor Destiny
When pumped into special dept.

Treated as Below:

| Tank No. | | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|---|
| | $K_2Mn_2O_8$ (⅛%) | 17½# | 12 M | 1/27 | | |
| | $H_2SO_4$ | 100 # | 9 A | 1/28 | | |
| | " | 98 # | " | 1/30 | Did not bleach | |
| | " | 70½ | 1 P | 1/31 | | |
| | " | 50 | 3 P | 1/31 | Bleached | |
| | Filled & Settled | | P | 2/1 | & washed | |
| | Drew off | | 4 P 6 P | 2/2 | Filled & washed | |
| | " " | | A | 2/4 | " " | |
| | " " | | P | 2/7 | Neutral to litmus | |
| | Stirred up | | A | 2/8 | Neut. to litmus & Methyl-orange | |

| | | | | |
|---|---|---|---|---|
| $MgCo_3$ 40# (¼%) | 11:30 A | 2/8 | To get white color | |
| $H_2SO_4$ 5# | 12:30 P | " | Neutralized | |

Pumped to tank No. #13 9 A Date 2/8/05
Tabled 2/8/05
Into kilns 2/9 Temp.
Dumped to hoppers 2/12
Packed, date 2/15 Lbs. 11760 = 15.5 Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Loss 4.5% in process
Sold to

[fol. 786] Plaintiff's Exhibit 79

Test Department

9:00 a.m.

Lot No. 58 Date 2/15/05

Wet Test from Process:

From W. H. Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color good Reaction
Condition when cold liquid Dirt
Condition cold after 24 hours

Plaintiff's Exhibit 79

Finished Dry Test

From Lot 58 W. H. Sample Date 2/18

Moisture
Method of test D. J.
Ratio of test 36 oz. starch to 3 gal. water=12 oz. to 1 gal.
Viscosity 15-15
Color good Reaction neutral
Body " Dirt some
Condition when cold Dissolving very good
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

Color much better than Lot 60 and little gum if any.

[fol. 787] Plaintiff's Exhibit 79

Test Department

7:15 a. m.

Lot No. 58 Date, 1/21/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 16 & 17
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with Carb. of Soda

Plaintiff's Exhibit 79

Test Department

5 p. m.

Lot No. 58 Date, 1/19/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 16-17
Color yellow Reaction neut.
Condition when cold liquid Dirt
Condition cold after 72 hours Solid over night
Neut. with carb. of soda

[fol. 788] Plaintiff's Exhibit 79

Test Department

5:00 p. m.

Lot No. 58 Date, 1/20/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 16-17
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with carb. of soda

Plaintiff's Exhibit 79

Test Department

7 a. m.

Lot No. 58 Date, 1/20/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 17-17 V.
Color yellow Reaction neut.
Condition when cold liquid Dirt
Condition cold after 72 hours
Neut. with Carb. of Soda

[fol. 789] Plaintiff's Exhibit 79

Process Record

Tank No. 11 Record of Lot 60 Date Ground 17th to 18th & 19th

Gross amount from tables 6477# Lot 59 Kind Cass.
Estimate of sieve loss Net
Inches of liquor 50½ Density 10°
When [pumped]* into special dept. 1/21

[*Word enclosed in brackets erased in copy.]

Treated as Below:

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Wasted some to #2 | | | | | |
| tank account stirrer hole | | | | | |
| Tank No. 11 Broke up | | P | 1/21 & settled | | |
| Drew off to 18" | | | | | |
| $H_2O$ | 7 | A | 1/23 & stirred up | | |
| 1st water from 198# } 3% | | | | | |
| chloride lime } | 9 | A | 1/23 & bbls. refilled $H_2O$ | | |
| Heat on | 1 | P | 1/23 Heater to 60 C | | |
| " off | 5 | P | 1/25 " | 60° | 55-11 |
| | | | | | 57-10 |
| 2nd water from 198# | | | | | |
| chloride lime | 9 | A | 1/24 | | |
| Tank filled | 5 | P | 1/25 Belt off | | |
| Drew off | 9 | A | 1/28 Filled & washed | | |
| " " | 9 | A | 2/1 " " | | |
| Stirred up | | A | 2/2 & dropped to #2 P | | |
| " " | 7 | A | 2/4 to | | 13° |

Tank No. 2

To kill the grit

2 $H_2O_2$ 16# 10 A " Tank was then neutral

Pumped to tank No. 13 Date 2/6/05

Tabled 2/6/05

Into kilns 2/7/05 Temp.

Dumped to hoppers 2/10

Packed, date 2/13 Lbs. 5225# Moisture

Some leaked out around stirrer in #11 tank

Viscosity, W. house sample By

Viscosity, Raw-mat. sample By

Loss

Sold to

[fol. 790] Plaintiff's Exhibit 79

Test Department

4:30 p. m.

Date 2/11/05.

Lot No. 60 Thin Boiling

Wet Test from Process:

From warehouse Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 16 & 17
Color good Reaction
Condition when cold Dirt
Condition cold after 72 hours

Plaintiff's Exhibit 79

Finished Dry Test:

From Lot 60 W. H. Sample Date 2/18

Moisture
Method of test D. J.
Ratio of test 36 oz. starch 3 gal. water = 12 oz.: 1 gal.
Viscosity 17-17
Color brownish Reaction neutral
Body good Dirt some from kiln
Condition when cold Dissolving fine
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

Color before boiling quite yellow
Lots of gum in kettle
Did not come to a boil after starch went in.

[fol. 791] Plaintiff's Exhibit 79

Test Department

6:30 a. m.

Lot No. 60 Date 1/25/05.

Wet Test from Process:

From 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color yellow Reaction neut.
Condition when cold liquid Dirt
Condition cold after 24 hours liquid
Neut. with carb. of soda

Plaintiff's Exhibit 79

Test Department
9 a. m.

Lot No. 60 Date 2/2/05.

Wet Test from Process:

From 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color good Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours

[fol. 792] Plaintiff's Exhibit 79

Test Department

5:00 p. m.

Lot No. 60 Date 1/23/05.

Wet Test from Process:

From 11 Tank No. Amount

Method of Test L. S.
Ratio of test 4:1
Viscosity 21 & 22
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with chloride of lime & a few drops of carb. of Soda

Plaintiff's Exhibit 79

Test Department

6:30 a. m.

Lot No. 60 Date 1/24/05.

Wet Test from Process:

From 11 Tank No. Amount

Method of Test L. S.
Ratio of test 4:1
Viscosity 20 & 21
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with chloride of lime & a little carb. of soda

[fol. 793] Plaintiff's Exhibit 79

Wet Test:

9:30 a. m.

Lot No. 60 Date 1/24/05.

From tank 11
Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 16 & 17
Color yellow Reaction neut.
Body Dirt
Condition when cold
Condition cold after 72 hours

Notes on Wet Test:

Neut. with carb. of soda

Plaintiff's Exhibit 79

Test Department

1:00 p. m.

Lot No. 60 Date 1/24/05.

Wet Test from Process:

From 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 16 & 17
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neutral to begin with

[fol. 794] Plaintiff's Exhibit 79

Test Department

Lot No. 60 Date 1/24/05.

Wet Test from Process:

From 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 16 & 17
Color Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours

Plaintiff's Exhibit 79

Test Department

5:00 p. m.

Lot No. 60 Date 1/25/04.

Wet Test from Process:

From 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with carb. of soda

[fol. 795] Plaintiff's Exhibit 79

Process Record

Tank No. Record of Lot 62 Date 1/28-2/1

Gross amount from cars-2 56800 Kind Cass.
Estimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

Treated as Below:

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. Formaldehyde | 2 qts. per tank | | | | |
| Na O H | 1 qt. | " | " | (dry) 2/2/05 | |

Pumped to tank No. 13 Date 2/2/05
Tabled 2/2/05
Into kilns 2/3/05 Temp.
Dumped to hoppers 2/6
Packed, date 2/7 Lbs. 14770 = 26% probably some gained from Lot #60
Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Loss 2/14
Sold to W. C. R. Co. & H. C. Co. 2#17

Plaintiff's Exhibit 79

Test Department

3:30 p. m.

Lot No. 62 Regular Date 2/11/05

Wet Test from Process

From warehouse Tank No. Amount

Method of test L. S.
Ratio of test 16:1 (½# starch to 1 gal. water)
Viscosity 40 & 42
Color Reaction
Condition when cold Dirt
Condition cold after 72 hours

[fol. 796] Plaintiff's Exhibit 79

Process Record

Tank No. 1 Record of Lot 63 Date resieved 2/2/05

Gross amount from warehouse 80-17240#
Estimate of sieve loss 12% = 2064# Net 15136#
Inches of liquor Density
When pumped into special dept.

Treated as Below:

| | Lots. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 3 | Sieved into | P | 2/2 | plus formaldehyde | |
| | Drew off-stirred | A | 2/3 | & pumped to 10 & 11 | |
| | 10 H. C. L. 133# | 12-1 P | " | | |
| | " $H_2$ S $O_4$ 89# | " | " | | |
| | 11 H. C. L. 433# | " | " | | |
| | " $H_2$ S. $O_4$ 289# | " | " | | |
| | Heat on | 3 P | " | Pump broke down 5 P | |
| | " " Tanks to | 8:30 A | 2/6 | Heater to 60° C. | |
| | " off 58° C | 10:30 A | 2/7 | belt on till 2/8 | |

| | | | |
|---|---|---|---|
| To #4 tank | P | 2/8 | & fiilled |
| Drew off | P | 2/10 " | " & washed |
| " " | " | 11 " | " " |
| " " | A | 13 " | " " |
| " " | A | 14 & | bleached |
| $K_2Mn_2O8$(1/12%) | 9.2# A | 2/14 | |
| Pumped to tank No. | Date | | |
| Centrifugled | | | |
| Into kilns | | | Temp. |
| Dumped to hoppers | | | |
| Packed, date Lbs. | | Moisture | |
| Viscosity, W. house sample | | By | |
| Viscosity, Raw-mat. sample | | By | |
| Loss | | | |
| Sold to | | | |

[fol. 797] Plaintiff's Exhibit 79

Process Record

Tank No. Record of Lot 63 Continued Date Resieved

Gross amount from warehouse Kind
Estimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

Treated as Below:

| | Lbs. | Time | Date | Temp. | Dens |
|---|---|---|---|---|---|
| Ran belt on till | | 1 P | 2/15 | | |
| $H_2SO_4$ | 100= | 1 P | " | | |
| " | 50# | 9:30 A | 2/16 | | |
| " | 50# | 9 A | 2/17 | | |
| Belt off | | 6 P | " | | |
| " | 50# | 1 P | 2/18 | Bleached | |
| 1 Stirred up | | 2 P | 2/20 | filled & washed | |
| 2 " " | | " | 2/21 | " | " |
| 3 " " | | " | 2/22 | " | " |
| 4 " " | | " | 2/24 | " | " |
| Drew off | | 7 A | 2/25 | & stirred to 8° B | |
| 13 Pumped to 13 | | 9 A | " | | |
| " Magnesium carb. | 25# | | " | to neut. | |
| $H_2SO_4$ | 1# | | " | " " | |

Pumped to tank No. 13 Date 2/25
Tabled 2/25/04
Into Kilns 2/26 Temp.
Dumped to hoppers
Packed, Date 3/6 Lbs. 13,860 Moisture
Viscosity, W. House sample By.
Viscosity, Raw-mat. sample By.
Loss 7.4% Process loss
Sold to

[fol. 798] Plaintiff's Exhibit 79

Test Department

10:00 a. m.

Lot No. 63 Date 3/7/05

Wet Test from Process:

From warehouse Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15
Color very good Reaction
Condition when cold liquid Dirt
Condition cold after 24 hours liquid

Plaintiff's Exhibit 79

Finished Dry Test:

10:30 a. m.

Lot No. 63
From warehouse

Date 3/7/05
Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 19 & 20
Color very good Reaction
Body Dirt
Condition when cold liquid Dissolving
Condition cold after 24 hours solid

Notes on wet test:

Notes on Dry Test:

[fol. 799] Plaintiff's Exhibit 79

Test Department

8:15 a. m.

Lot No. 63 Date 2/7/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 15 & 16
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with carb. of soda

Plaintiff's Exhibit 79

Test Department

1:00 p. m.

Lot No. 63 Date 2/7/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 15 & 16
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with carb. of soda

[fol. 800] Plaintiff's Exhibit 79

Test Department

2:30 p. m.

Lot No. 63 Date 2/7/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 15 & 16
Color good Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with magnesium

Plaintiff's Exhibit 79

Test Department

Lot No. 63 Date 2/8/05

4:00 p. m.

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color yellow Reaction neut.
Condition when cold Dirt
Condition cold after 72 hours
Neut. with carb. of soda

[fol. 801] Plaintiff's Exhibit 79

Test Department

Lot No. 63 Date 3/2/05

Wet Test from Process:

From kiln Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15-15-16
Color very good Reaction neut.
Condition when cold liquid Dirt
Condition cold after 24 hours liquid

[fol. 802] Plaintiff's Exhibit 79

Process Record

Tank No. 1 Record of Lot 66 Date resieved 2/15

Gross amount from warehouse 60 sax =
12930 G. T. A.
700 Kind sweeps
Estimate of sieve loss 1512 Net 11788
Inches of liquor 42 Density 6°B
When pumped into special dept. 2/17
For 9:1 goods liquid when cold } Treated as Below:

| | | Lbs. | | Time | | Date | Temp. | Dens. |
|---|---|---|---|---|---|---|---|---|
| Tank No. 5 & 6½ qt. Formaldehyde | | | | | | | | |
| Drew off & pumped to 10 & 11 2/17 | | | | | | | | |
| 3420 | 10 | H C L | 103 | 10:15 | A | 2/17 | | 15° |
| | | $H_2SO_4$ | 68 5% | 10:35 | A | " | | " |
| 8798 | 11 | H C L | 264 | 9:30-10 | A | " | | 13-4/5° |
| | | $H_2SO_4$ | 176 | 10:30 | A | " | | " |
| | | Heat on | | 9 | A | 24 hr. 2/17 | Heater to | 58°C |
| | | " off | | 10 | A | 2/18 | Heater | 58 |
| | | | | | | | Tanks | 55 |
| | | | | | | | | 56 |
| | 3 | Dropped to #3 | | 2-3 | P | 2/18 | stirred & filled | |
| | | Drew off | | " | P | 2/20 | " | " |
| | | " " | | " | P | 2/21 | " | " |
| | | " " | | " | P | 2/22 | " | " |
| | | " " | | 2-3 | P | 2/23 | plus $K_2Mn_2O_8$ | 2/24 |

Pumped to tank No. Date
Centrifugled
Into kilns Temp.
Dumped to hoppers
Packed, date Lbs. Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Loss
Sold to

[fol. 803] Plaintiff's Exhibit 79

Process Record

Tank No. Record of Lot 66 continued Date resieved

Gross amount from warehouse Kind
Estimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

Treated as Below:

| Tank No. | | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|---|
| | $K_2Mn_2O_8$ | 13-½(1/8%) | 1 P | 2/24 | Belt off 2/25 P to bleach | 13° |
| 3 | Drew off | | 7 A | 2/27 | & partly filled & stirred | |
| | $H_2SO_4$ | 200# | 9 A | 2/27 | | 13° |
| | " | 75# | 9:30 A | 2/28 | | |
| | " | 50 | 3:15 P | 3/1 | Bleached | |
| | Filled up | | 3-4 P | 3/2 | & washed | |
| | Drew off | | 7 A | 3/4 | filled & washed | |
| | " " | | 7 A | 3/6 | " " | |
| | " " | | " | 3/10 | & stirred | 8° |
| | Mg. carb. | 15 | " | " | to neutralize | |

Pumped to tank No. 13 Date 3/10
Tabled 3/10
Into kilns 3/13/05 Temp. 160
Dumped to hoppers 3/16
Packed, date 3/17 Lbs. 12,400 = 9.8% loss sieves & process
Moisture
Viscosity, W. house sample 15-16 By L. S. 9:1
Viscosity, 20-20-19 By " 4:1
Loss
Sold to

[fol. 804] Plaintiff's Exhibit 79

Finished Dry Test:

Lot 66 3:30 p. m.
From warehouse Date 3/22

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color very good Reaction neut.
Body poor Dirt
Condition when cold liquid Dissolving poor
Condition cold after 12 hours

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Finished Dry Test:

3:30 p. m.

Lot 66
From warehouse Date 3/22/05

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color very good Reaction neut.
Body poor Dirt
Condition when cold liquid Dissolving very poor
Condition cold after 12 hours liquid

Notes on Wet Test:

Notes on Dry Test:

[fol. 805] Plaintiff's Exhibit 79

Finished Dry Test:

Lot 66 4 p. m.
From warehouse Date 3/22

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 20-20 & 19
Color very good Reaction neut.
Body Dirt
Condition when cold liquid Dissolving very poor
Condition cold after 12 hours solid

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Finished Dry Test:

Lot 66 4:00
From warehouse Date 3/22

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 20-20-19
Color very good Reaction neut.
Body Dirt
Condition when cold Dissolving very poor
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

[fol. 806] Plaintiff's Exhibit 79

Test Department

Lot No. 66 7:00 a. m. Date 2/18/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 15 & 16
Color yellow Reaction neut. with carb. soda

Condition when cold liquid Dirt
Condition cold after 24 hours

Plaintiff's Exhibit 79

Test Department

10:00 a. m.

Lot No. 66 Date 2/18/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color yellow Reaction neut. with carb. of soda

Condition when cold liquid Dirt
Condition cold after 72 hours

[fol. 807] Plaintiff's Exhibit 79

Process Record

Tank No. Record of Lot 67 Date resieved 2/17-
Cars—88250
Gross amount from warehouse Kind Cassava
Estimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

Treated as Below:

Qt.
½ Formaldehyde per tank
½ Caustic " "
Pumped to tank No. 13 Date 2/23
Tabled 2/23
Into kilns 2/24-2/25 Temp.
Dumped to hoppers 2/27
Packed, date 3/2 Lbs. 17955 = 20.3% Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Loss
Sold to

Plaintiff's Exhibit 79

Test Department

Lot No. 67 1 p. m. Date 3/7/05

Wet Test from Process

From warehouse Tank No. Amount

Method of test L. S.
Ratio of test 16.1
Viscosity 69-71-& 76
Color very good Reaction
Condition when cold semi-liquid Dirt
Condition cold after 24 hours semi-liquid

[fol. 808] Plaintiff's Exhibit 79

Process Record

Tank No. 1 Record of Lot 68 Date resieved 2/23/04
Gross amount from warehouse 60 Sax, 12930# Kind G. T. A.
Estimate of sieve loss 12% = 1512# Net 11088
Inches of liquor 37½ Density 6
When pumped into special dept. 2/24/04

Treated as Below:

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. Drew off pumped 10 & 11 | 10 A | | 2/24 | & settled | 11° |
| 10 & 11 " " & stirred up | A | | 2/27 | | 22° |
| | | | | | from #12 |
| Used liquor 448# (4%) of B. P. to stir added $H_2O$ | | | | | |
| 10 $H_2SO_4$ | 72 (2%) | | | | 16° |
| 11 " | 153 (2%) | | | | 16° |
| Heat on | 3 P | | 2/27 | Heater to 55 C-131'F | |
| " off | 3 A | 12 | 2/28 | " | |
| " on | 6:30 A | 2-1/2 | 2/28 | " | |
| " off | 9 A | 14-1/2 | 2/28 | " Tank 48 C | |
| Dropped to #4 | 10 A | | 2/28 & filled | | 16° |
| 4 Drew off | 7 A | | 3/2 & stirred in own water | | |
| $H_2SO_4$ (¼%) 28# 1:15 P | | | 3/2 to kill grit | | |

See Lot 68 continued
Pumped to tank No. 13 Date 3/8/05
Tabled 3/8
Into kilns 3/9 Temp.
Dumped to hoppers 3/12
Packed, date 3/11 & 3/13 Lbs. 10640 = 15.5% loss sieves & process
Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat sample By
Loss
Sold to L. M. P. 22 bags 3/11/05
100% H. C. L. 10:30-¾
28 per of s. 2-4 & filled up ¾
Drew off & filled 3/6
14# caustic at 16°

[fol. 809] Plaintiff's Exhibit 79

Process Record

Tank No. Record of lot 68 continued Date resieved
Gross amount from warehouse Kind
Eestimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

Treated as Below:

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 4 H. C. L. | 100 | 10:30 | A 3/4 | | |
| Per of soda | | 28 | 2-4 P " | filled up | |
| Drew off & | | | 7 A 3/6 | filled up | |
| " " | | | " 3/8 | & stirred | 8° |
| Na O H 14# (16°) | | | " " | to neutralize & kill grit | |

Pumped to tank No. 13 Date 3/8
Table 3/8
Into kilns 3/9 Temp.
Dumped to hoppers 3/12
Packed, date 3/11 & 3/13 Lbs. 10640 Moisture 15.5%
loss sieve & process
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Sold to L. M. P. 22 bags 3/11

Plaintiff's Exhibit 79

Dry Test

From racks Lot 68

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 20-21
Color good Reaction
Body good-short Dirt
Condition when cold liquid Dissolving very poor
Condition cold after 24 hours solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 810] Plaintiff's Exhibit 79

Test Department

Lot No. 68 Date 3/13

Finished Dry Test:

From racks Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 30 & 31
Color good Reaction neut.
Condition when cold liquid Dirt
Condition cold after 24 hours solid Dissolving very poor

Plaintiff's Exhibit 79

Test Department

1:15 p. m.

Lot No. 68 Date 3/13

Finished Dry Test:

From racks Tank No. Amount

Method of test L. S.
Ratio of test 4:1
Viscosity 30 & 31
Color good Reaction neut.
Condition when cold liquid Dirt
Condition cold after 24 hours solid Dissolving very poor

[fol. 811] Plaintiff's Exhibit 79

Test Department

10:30 a.m.

Lot No. 68 Date 3/2/05

Wet Test from Process:

From Lab. Dry Starch Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15
Color very good Reaction neut.
Condition when cold liquid Dirt
Condition cold after 24 hours semi-liquid
Neut. with carb. soda

Plaintiff's Exhibit 79

Test Department

7:00 a.m.

Lot No. 68 Date 2/28/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 15
Color yellow Reaction neut.
Condition when cold liquid Dirt
Condition cold after 24 hours semi-liquid
Neut. with carb. of soda

[fol. 812] Plaintiff's Exhibit 79

Finished Dry Test:

Lot 68 1:30 p.

From W. H. Date 5/3

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 26-26
Color very good Reaction neut.
Body thin Dirt not any
Condition when cold near solid Dissolving very poor
Condition cold after 15 hours solid

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Finished Dry Test:

Lot 68 3 P

From warehouse Date 4/27

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 16:16
Color very good Reaction
Body thin Dirt
Condition when cold liquid Dissolving very poor
Condition cold after 24 hours near solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 813] Plaintiff's Exhibit 79

Process Record

Tank No. Record of lot 69 Date resieved

Gross amount from warehouse 2 cars 30,700 Kind Cassava
Estimate of sieve loss Net Est. 20% 6,140
Inches of liquor Density
When pumped into special dept.

Treated as Below:

Tank No. 1 Pt. Formaldehyde } per tank
1 " Na O H }
Pumped to tank No. 13 Date 3/4/5
3/4/5
Into kilns 3/6/5 Temp.
Dumped to hoppers 3/8/05
Packed, date 3/9/05 Lbs. 7,050 = 22.9% yield Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Loss
Sold to L. M. P. 3/11/05

[fol. 814] Plaintiff's Exhibit 79

Process Record

Tank No. 1 Record of Lot 70 Date resieved 3/17/05

Gross amount from warehouse 12,000 Kind Sago
Estimate of sieve loss 5% 600 Net 11,400
Inches of liquor 36 Density 6
When pumped into special dept. 3/18

Treated as Below: Veneers

| | | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|---|
| Tank No. 8 | Drew off & stirred A | | | 3/18 | pumped to 11 | 18¾ |
| 11 | $Na_2O_2$ | 24# | 1 P | " | | 22 |
| | NaOH | 48# | 1:30 P | " | | |
| | $Na_2O_2$ | 24 | 11:25 A | 3/22 | | |
| 2 | Dropped to #2 | | P | 3/23 & settled | | |
| 2 | Stirred up | | 7 A | 3/28 | | |

Pumped to tank No. 13 Date 3/28
Tabled 3/28
Into kilns 3/29 Temp.
Dumped to hoppers 4/1
Packed, date 4/6 Lbs. 10,800 = 10% sieve & process loss Moisture
Viscosity, W. house sample 19-20 By L. S. 9:1
Viscosity, Raw-mat. sample 49-40-47 By " 4:1
Loss
Sold to L. M. P. 4/17

[fol. 815] Plaintiff's Exhibit 79

Finished Dry Test:

Lot 70 4:00 P

From warehouse Date 4/5

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 19 & 20
Color dark Reaction
Body thin Dirt
Condition when cold solid Dissolving good
Condition cold after 12 hours solid

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Finished Dry Test:

Lot 70 4:50 P.

From warehouse Date 4/5

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 49-40-47
Color dark Reaction
Body good Dirt
Condition when cold solid Dissolving good
Condition cold after 12 hours solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 816] Plaintiff's Exhibit 79

Finished Dry Test:

Lot No. 70 5:00 P

From dry kiln in lab. Date 3/20

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 29
Color yellow Reaction neut. after drying with $H_2SO_4$
Body good Dirt
Condition when cold semi-liquid Dissolving good
Condition cold after 3 or 4 hours solid

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Finished Test:

Lot 70 5:30 P
From 11 Date 3/21

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 28:29 & 30
Color yellow Reaction neut. with $H_2SO_4$
Body good Dirt
Condition when cold semi-liquid Dissolving
Condition cold after 3 or 4 hours solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 817] Plaintiff's Exhibit 79

Test Department

10:30 a. m.

Wet Test from Process:

Lot No. 70 Date 3/21

From tank 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1 (4¼° B)
Viscosity 25 & 26
Color yellow Reaction neut. with $H_2SO_4$
Condition when cold semi-liquid Dirt
Condition cold after 3 or 4 hours solid

Plaintiff's Exhibit 79

Finished Test:

Wet

Lot 70 4:30 P.

From 11 Date 3/20

Moisture
Method of test L. S.
Ratio of test 9:1 (4¼° B)
Viscosity 27 & 28
Color yellow Reaction neut. with $H_2SO_4$
Body good Dirt
Condition when cold semi-liquid Dissolving
Condition cold after 3 or 4 hours solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 818] Plaintiff's Exhibit 79

Lot 70
From lab. kiln Date

Moisture
Method of test L. S.
Ratio of test 10 oz. starch to 1 gal. water
Viscosity 23 & 24
Color yellow Reaction neut.
Body good Dirt
Condition when cold semi-liquid Dissolving good
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Test Department

Lot No. 70 9:15 a. m. Date 3/23

Wet Test from Process:

From 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1 (4¼° B)
Viscosity 23 & 24
Color yellow Reaction neut. with $H_2SO_4$
Condition when cold solid Dirt
Condition cold after 72 hours

[fol. 819] Plaintiff's Exhibit 79

Process Record

3/20/05

Tank No. 10. Record of lot 71 Date Not sieved

Gross amount from warehouse 30 bags 6465 Kind G. T. A.
Estimate of sieve loss Net 6510
Inches of liquor 53 Density 21
When pumped into special dept. 3/21

Treated as below:

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 10 30 Sax | 6510 | A | 3/20 | | 22 |
| $Na_2O_2$ | 16 | 1:20-7P | " | | " |
| Na O H | 32 | 1:25-7:40 | " | | " |
| $Na_2O_4$ | 16 | 10 A-5:25P | 3/22 | | |
| Dropped to #4 | | P | 3/23 | | |
| Stirred up | | A | 3/25 | | 6½ |

Table fine—unsieved G. T. A.
Pumped to tank No. 13 Date 3/25
Tabled 3/25
Into kilns 3/27 Temp.
Dumped to hoppers 3/29
Packed, dated 4/1 Lbs. 5,400 Loss=17% ? Moisture
Viscosity, W. house sample 20-21 By 9:1 L. S.
Viscosity, sample 55-55 By 4:1
Loss
Sold to L. M. P. 4/17

[fol. 820] Plaintiff's Exhibit 79

Finished Dry Test:

11 A

Lot 71
From warehouse Date 4/1/05

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 20 & 21
Color good Reaction neut.
Body good Dirt
Condition when cold Dissolving good
Condition cold after 2 hours solid

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Finished Dry Test:

Lot 71 11 a. m.
From warehouse

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 55-55
Color good Reaction neut.
Body good Dirt
Condition when cold Dissolving good
Condition cold after 2 hours solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 821] Plaintiff's Exhibit 79

Finished Dry Test:

10 a. m.

Lot 71
From 10 Date 3/23
Moisture
Method of test L. S.
Ratio of test 9:1 (4¼° B)
Viscosity 23 & 24
Color very good Reaction neut. with $H_2SO_4$
Body good Dirt
Condition when cold semi-liquid Dissolving
Condition cold after 72 hours

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Finished Wet Test

Lot 71 5:30 p.
From 10 Date 3/21
Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 1 min. & 35 c $1^{m}$ c $42^{sec}$
Color good Reaction neut. with $H_2So_4$
Body good Dirt
Condition when semi-liquid Dissolving
Condition cold after 12 hours semi-liquid

Notes on Wet Test:

Notes on Dry Test:

[fol. 822] Plaintiff's Exhibit 79

Notes on Dry Test:

11a.

From Lot 71 Trails Date 4/27

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 22-17 & 18
Color fair, little dark Reaction
Body thin Dirt
Condition when cold nearly solid Dissolving good
Condition cold after 72 hours solid

Notes on wet test:

Notes on dry test:

Plaintiff's Exhibit 79

Test Department

10. m.

Lot No. 71 Date 3/21

Wet test from Process:

From Tank 10 Tank No. Amount

Method of test L. S.
Ratio of test 9:1 (4¼°B)
Viscosity 2 min. & 15 Sec.
Color good Reaction neut. with $H_2SO_4$
Condition when cold semi-liquid Dirt
Condition cold after 12 hours semi-liquid

[fol. 823] Plaintiff's Exhibit 79

Process Record

Tank No. 1 Record of Lot72 Date received 3/18/05
Gross amount from warehouse 100 bags
12000 King Sago
Estimate of sieve loss 5% = 600# Net 11400 sieved 3/18
Added 189 bags 22680# on 3/28
Inches of liquor less 5% Density 21545 " 3/28

When pumped into special dept. Total 31946 lbs.

Treated as Below: Veneers

| | Lbs. | Time | Date | Temp. | Dens. |
|---|---|---|---|---|---|
| Tank No. 8 Settled from 3/18 to 3/21 to #11 & back to #4 | | | | | |
| 3 & 4 | Ran in 189 bags sieved on 3/28 & settled | | | | |
| 3 & 4 | Drew off | 7 A | 3/29 | | |
| 4 | Resieved & ran in what was left in tanks 1 & 3 to #4 | | | | |
| 4 | B. P. (4%) 1278# (Dry) | 10 A-1P | 3/30 at 22°B | | |
| 4 | $H_2S O_4$ (1%) 319# | 2 P | " this neutralized) | | |
| 4 | Tank filled | 1 P and part | 3/31 pumped to 13 8-1/2 | | |
| 4 | Blue 9000 C.C. | 2 P | 3/31 | | |
| B. P. & $H_2S O_4$ brought this down in 18 hrs. to 15=16 V. 9:1 | | | | | |

Part
Pumped to tank No. 13-13 Date 3/31-4/4
Tabled 3/31-4/4
Into kilns 4/1-4/6 Temp.
Dumped to hoppers 4/6
Packed, date 4/11 & 4/17 Lbs. 28200=Loss 18.6% Moisture
Viscosity, W. house sample By
Viscosity, Raw mater. sample By
Loss = 18.6% sieve & process
Sold to L. M. P. 4/17

[fol. 824] Plaintiff's Exhibit 79

Finished Dry Test:

From #4 Sago Date 3/31

Moisture #72
Method of test L. S.
Ratio of test 9:1
Viscosity 15-15
Color good Reaction neutral
Body fair Dirt
Condition when cold Dissolving good

Condition cold after 72 hours

Notes on wet test:

Notes on dry test:

Plaintiff's Exhibit 79

Wet:

From #4 Sago Date 3/31

Moisture Lot 72
Method of test L. S.
Ratio of test 9:1
Viscosity 15-16
Color good Reaction neutral
Body fair Dirt
Condition when cold Dissolving
Condition cold after 12 hours

Notes on wet test:

After 4% B. P. & 1% $H_2SO_4$

Notes on dry test:

[fol. 825] Plaintiff's Exhibit 79

Finished Dry Test:

2 P

Lot 72

From W. H. Date 5/3

Moisture Sago
Method of test L. S.
Ratio of test 4:1
Viscosity 23:24
Color fair Reaction neut.
Body little thin Dirt a little
Condition when cold solid Dissolving good
Condition cold after 15 hours solid

Notes on wet test:

Notes on dry test:

Plaintiff's Exhibit 79

Finished Dry Test:

2:50 p. m.

Lot 72

From warehouse Date 4/27

Moisture Sago
Method of test L. S.
Ratio of test 9:1
Viscosity 16:16
Color good Reaction neut.
Body thin Dirt some grit
Condition when cold liquid Dissolving good
Condition cold after 24 hours near solid

Notes on wet test:

Notes on dry test:

[fol. 826] Plaintiff's Exhibit 79

Process Record

Tank No-. 6 & 7 Record of Lot 74 Date Ground 3/21
Gross amount from last car from L. C. 16200 Kind Cassava
Estimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

Treated as Below: Veneers
Roots were quite rotten

Lbs. Time Date Temp. Dens.

Tank No. ½ Pt. Formaldehyde per tank
½ " Na O H " "
Roots were so rotten was necessary to table two times to get pumace all out
Pumped to tank No. 13 Date 3/23
Tabled 3/23—and again 3/25
Into kilns 3/27 Temp.
Dumped to hoppers 3/29
Packed, date 3/31 Lbs. 2800 = 17.3% yield Moisture
Viscosity, W. house sample 1 M-43 S. By 16:1 L. S.
Viscosity, Raw Mat. sample By
Loss
Sold to L. M. P. 4/17

Plaintiff's Exhibit 79

Finished Dry Test:

Lot 74 10:15 a.

From warehouse Date 4/1/05

Moisture
Method of test
Ratio of test
Viscosity 1 min. & 43 sec.
Color very good Reaction
Body good Dirt
Condition when cold Dissolving
Condition cold after 2 hours solid

Notes on wet test:

Notes on dry test:

[fol. 827] Plaintiff's Exhibit 79

Process Record

Tank No. 1 Record of lot 75 Date resieved 3/27

Gross amount from warehouse 70 bags 15085 Kind G.T.A.
Added 2155# from Lot 73 (10 bag)
Estimate of sieve loss 12% Net 15165#
Inches of liquor Density
When pumped into special dept.

Treated as Below:

| | | Lbs. | Time | Date | Temp. | Cops Dens. |
|---|---|---|---|---|---|---|
| Tank No. 7&8 | Drew off | | A | 3/29 & stirred | | |
| 10 & 11 | Pumped to 10 & 11 | | 2P | " | 10 | 16 |
| | | | | | 11 | 14-½ |
| | Heat on | | 2:05 P | " | Heater to 55°C | |
| 10 | HCL (3%) | 128# | 5 P | " | Tanks 50 & 52° | |
| 11 | " " | 290# | 5 P | " | " " " " | 8 p |
| Too much made alkaline in morning | Heat off | | 8 P | " | " " " " | |
| | Bi-card. | 250# | 8 P | 3/29 | Neutralize Belt on | |
| | " " | 100# | 9 P | " | " all night | |
| | Heat on | | 8 A | 3/30 | Heater to 120°F. | |
| 10 | Na OH (8°) | 85# | 11:30 A | 11:30 P | 3/30 | do |
| 11 | " | 193# | 5:30 P | 3/30 2 A | 3/31 | do |
| | Heat off | | 2 A | 3/31 | | do |
| Tank 10 | Per. of soda | 20# | 9-A-4P | 3/31 | (This bro't it from | |
| " 11 | " " " | 50# | 10A 4P | " | (23 V to 15 V 9:1 | |
| | | | | | (L. S. Dry | |

Heat on 10 A 3/31 to 131F
" off 5 P " Belt on all night
Dumped to #2 4/1 Drew off 4/3 & washed
Drew off 4/8 stirred & added
85# $H_2SO_4$ to neut.

Pumped to tank No. Date 4/10
Tabled 4/10 13
Into kilns 4/11 & 4/12 Temp.
Dumped to hoppers
Packed, date Lbs. 13400 = 23.5% Loss Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Loss = 23.5% loss sieves & process
Sold to L. M. P. 4/17

[fol. 828] Plaintiff's Exhibit 79

Finished Dry Test:

From W. H. Lot 75 Date 4/19

Moisture 1# starch to 2# $H_2O$
Method of test 7# $H_2O$ plus 23 g (5%) Na O H
Ratio of test in D. J. Kettle
Viscosity would not boil until put lid on 24 V.
No gum in kettle.
Color Reaction
Body would not Dirt reboil
Condition when cold Dissolving
Condition cold after 72 hours For H. C. Co.

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Test Department

4 p.

Lot No. 75 Date 4/19

Dry Test from W. H.

From warehouse Tank No. Amount

Method of test L. S. (¾ # starch to 6¾ # water)
Ratio of test 9:1
Viscosity 15 & 16
Color yellowish Reaction neut.
Condition when cold liquid
Condition cold after 24 hours solid
Body thin when hot & cold

[fol. 829] Plaintiff's Exhibit 79

Finished Dry Test:

4:30 p.

Lot 75

From warehouse Date 4/19

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 25 & 23
Color yellow Reaction neut.
Body good Dirt
Condition when cold solid Dissolving good
Condition cold after 24 hours solid

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Test Department

8 a. m.

Lot No. 75 Date 3/31

Wet Test from Process:

From 10 & 11 Tank No. Amount
Method of test L. S.
Ratio of test 9:1
Viscosity 23 & 24
Color yellow Reaction neut. with $H_2SO_4$
Condition when cold semi-liquid Dirt
Condition cold after 5 hours solid

[fol. 830] Plaintiff's Exhibit 79

Test Department

7 a. m.

Lot No. 75 Date, 4/1/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of Test L. S.
Ratio of test 9:1
Viscosity 15 & 16
Color yellow Reaction neut. with $H_2SO_4$
Condition when cold liquid Dirt
Condition cold after 72 hours

Plaintiff's Exhibit 79

Wet Test

9 a. m.

From 10 Lot 75 Date 3/30

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 24-22/23
Color yellow Reaction alkaline
Body Dirt
Condition when cold semi-liquid Dissolving
Condition cold after 1 hr. solid

Notes on Wet Test:

Notes on Dry Test:

[fol. 831] Plaintiff's Exhibit 79

Finished Wet Test:

Lot No. 75

From 10 & 11 Date

Moisture 1 gal. starch at 4¼ neut. with $H_2S O_4$ added 88 c. c. Na O H

Method of test L. S.
Ratio of test 9:1
Viscosity 19:20
Color yellow Reaction alkaline
Body Dirt
Condition when cold semi-liquid Dissolving
Condition cold after 12 hours solid

Notes on Wet Test:

Notes on Dry Test:

Plaintiff's Exhibit 79

Test Department

9 a. m.

Lot No. 75 Date 3 30

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 23 & 24
Color good Reaction neut. with $H_2 SO_4$
Condition when cold semi-liquid Dirt
Condition cold after 12 hours solid

[fol. 832] Plaintiff's Exhibit 79

Finished Dry Test:

Lot 75 7:30 a.

From lab. kiln Date 4/1/05

Moisture

Method of test L. S Ratio of test 9:1

Viscosity 15 & 16

Color yellow Dirt

Body thin Reaction neut.

Condition when cold liquid Dissolving good

Condition cold after 72 hours.

Notes on Wet Test:

Notes on Dry Test:

[fol. 833] Plaintiff's Exhibit 79

Process Record

Tank No. 1 Record of lot 76 Date resieved 4/1

Gross amount from warehouse 70 bags 15085 Kind G.T.A.

Estimate of sieve loss 12% = 1807# Net 13278

Inches of liquor Density

When pumped into special dept.

Treated as below:

| | Lbs. | Time | Date | Temp. | Cops Dens. |
|---|---|---|---|---|---|
| Tank No. 7 & 8 Drew off | | A | 4/3 | Pumped to 10 & 11 | |
| 10 H C1 3% | 124# | 9:30 A | 4/4 | | 14 |
| 11 H C1 3% | 243 | 9:40 " | " | | 12 |
| Heat on | | 7 A | 4/4 | Heater to 55°C | |
| Heater to 55°C at | | 8:10 | Ran 1 hr. before acid | | |
| 10 Bi-carb. (92# | | 4:10 P | 5:30) | Just neutral | |
| 11 " " (3/4)184# | | " | " | after dropping to #4 | |
| Heat off (9 hrs) | | 4 P | Pump off 5:30 P. | | |
| Dropped to #4 | | 10 A | 4/5 partly filled & settled | | |
| Drew off (belt off again) | | A | 4/12 & filled & stirred to 8 | | |

Pumped to tank No. 13 Date 4/14

Tabled 4/14 Centrifugled

Into kilns 4/16 Temp.

Dumped to hoppers 4/20

Packed, date See Lot 82 Lbs. Moisture

Viscosity, W. House sample By 9:1 - 16-17

Viscosity, sample By 4:1 - 60-61

Loss Sold to Boston

[fol. 834] Plaintiff's Exhibit 79

Test Department

1:30 p.

Lot No. 76 Date 4/27

Dry test from W. H.

From warehouse Tank No. Amount

Method of test L. S.
Ratio of test 9:1 Body thin
Viscosity 16-17-18 Dissolving—good
Color very good Reaction
Condition when cold liquid Dirt not any
Condition cold after 24 hours solid

Plaintiff's Exhibit 79

Finished Dry Test:

Lot 76 9:30 a.
From warehouse Date 5/3

Moisture
Method of test L. S.
Ratio of test 4:1
Viscosity 60-61
Color dark Reaction neut.
Body good Dirt not any
Condition when cold solid Dissolving good
Condition cold after 24 hours solid

Notes on wet test:

Notes on dry test:

[fol. 835] Plaintiff's Exhibit 79

Finished Dry Test:

7 a.

Lot 76
From lab. kiln Date 4/5

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 18
Color good Reaction neut.
Body good Dirt
Condition when cold semi-liquid Dissolving good
Condition cold after 12 hours solid

Notes on wet test:

Notes on dry test:

Drying

Slightly acid
before drying

Plaintiff's Exhibit 79

Finished Dry Test:

Lot 76 3 p.
From lab. kiln Date 4/5

Moisture
Method of test L. S.
Ratio of test 9:1
Viscosity 17 & 18
Color good Reaction neut.
Body good Dirt
Condition when cold semi-liquid Dissolving good
Condition cold after 12 hours solid

Notes on wet test:

Notes on dry test:

Neut. before drying

[fol. 836] Plaintiff's Exhibit 79

Test Department

3:30 p.

Lot No. 76 Date 4/4/05

Wet Test from Process:

From 10 & 11 Tank No. Amount

Method of test L. S.
Ratio of test 9:1
Viscosity 20 & 21
Color good Reaction neut. with Bi-carb. soda
Condition when cold semi-liquid Dirt
Condition cold after 12 hours solid

Plaintiff's Exhibit 79

Finished Dry Test:

From lab. kiln 10 & 11 Date 4/8

Moisture Lot 76—Test for H. C. Co.
Method of test D. J. 76 Test for H. C. Co.
Ratio of test 400 g. starch(8 9#)805 g $H_2O$(1-7/9#) mixed together
Viscosity 6¼ " $H_2O$ plus 23 g Na O H put in kettle
Color Boiled & starch liquor put in slowly Killed boil. Tried to boil 20 min. put in remainder & tried to boil for 20 m. more Result: Quite thin and very dark.
Condition when cold Dissolving
Condition cold after 72 hours

Notes on wet test:

Would not boil while stirring; had to keep cover on kettle to get to boil at all. Scum on kettle. Scum ⅛ " thick after dipping out liquor: semi-liquid cold. Did not try to reboil but so thick was doubtful if it would or not after cooling.

Notes on dry test:

[fol. 837] Plaintiff's Exhibit 79

Heat Report

Planters' Mfg. Co.

| Lot No. 76 | | | | Remarks |
|---|---|---|---|---|
| Heat | #10 | #11 | | Began boiling 7 a. m. 4/4/05 |
| 6:30 a. m. | | | | Heater started at |
| 7:30 " | 43°C | | | 35 and went to 55 |
| 8:10 " | 55°C | | | in 1 hr. & 10 min. |
| 9:10 " | 55°C | 126°B | 114°D | 124# H C L in #10 |
| 10:30 " | 55 | 127 | 118 | 9:35 a. m. 4/4 |
| 11:30 " | 55 | 127 | 119 | 243# H C L in #11 |
| 12:30 p. m. | 55 | 129 | 122 | at 9:40 a. m. 4/4 |
| 1:30 " | 55 | 129 | 123 | 92# bi-carb. soda |
| 2:30 " | 55 | 129 | 125 | in #10 4:10-5:35 |
| 3:30 " | 55 | 129 | 125 | 184# bi-carb. in 11 |
| 4:00 " | 55 Steam shut off 4:00 at 4:10-5:30 | | | |
| 5:30 " | Shut down 5:30 | | | |
| 6:30 " | | | | |
| 7:30 " | | | | |
| 8:30 " | | | | |
| 9:30 " | | | | |
| 10:30 " | | | | |
| 11:30 " | | | | |
| 12:30 a. m. | | | | |
| 1:30 " | | | | |
| 2:30 " | | | | |
| 3:30 " | | | | |
| 4:30 | | | | |
| 5:30 | | | | |

F. M. W. Tank Man

[fol. 838] Plaintiff's Exhibit 79

Process Record

Tank No. Record of Lot 80 Date re-bagged 4/18/05
Gross amount from warehouse 25-200# bags 5000#
Kind G. T. A.
Estimate of sieve loss Net
Inches of liquor Density
When pumped into special dept.

Treated as Below:

Re-bagged so as to get car out at full weight of 60,000 pounds in a hurry
Pumped to tank No. Date
Centrifugled
Into kilns Temp.
Dumped to hoppers
Packed, date Lbs. Moisture
Viscosity, W. house sample By
Viscosity, Raw-mat. sample By
Loss
Sold to L. M. P. 4/18

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[fol. 839] In the United States District Court for the Northern District of Illinois, Eastern Division

In Equity. No. 127

Perkins Glue Company, Complainant,

vs.

The Solva Water Proof Glue Company, The Burch-Kane Company, Lowell R. Burch, and Thomas P. Kane, Defendants

Stipulation

It is hereby stipulated and agreed by and between the parties to the above entitled cause for the purposes of this suit only, and in order to expedite the trial thereof that

the following statement of facts is true and correct but that neither party shall be precluded from adducing additional facts not inconsistent herewith.

On and prior to January 1, 1905, L. M. Palmer had a plant at Poplar Bluff, Missouri, and comprised in the said plant was an equipment for the preparation of glue and its use for gluing veneer barrel heads. That prior to, and on January 1, 1905 the said Company was using casein glue for the purpose of gluing veneered headings; that the plant was subsequently transferred to the Brooklyn Cooperage Company. That from some time prior to January 1, 1905 until on or about the 16th day of August, 1906, Nelson Windsor was Assistant Superintendent of the said Plant at Poplar Bluff; that on last mentioned date, he left said plant; that during the period from January 1, 1905 until August 16th, 1906, said Windsor wrote letters, which were contemporaneously press copied in two regular books, which were used in the regular business of the plant. After press copying such letters the same were regularly mailed to the addresses named thereon on or about the respective dates of such letters.

The two copy books above mentioned have been inspected by counsel for the respective parties, and it is stipulated that the letters in said copy books itemized in the following list shall be transcribed by the Notary Public taking the present depositions, and certified by him, and marked as follows, that is to say:

[fol. 840] Letter from Nelson Windsor to Lowell M. Palmer, dated 2-21-05, found on page 311 of the first letter book which letter is marked Windsor letter No. 1.

Telegram ..... from same to same dated 2-21-05, page 311, marked Windsor letter No. 2.

Letter from same to same dated 2-22-05, pages 313 to 316 inclusive marked Windsor letter No. 3.

Letter from same to same dated 2-27-05, found on page 328 and marked Windsor letter No. 4.

Letter from same to same dated 3-7-05 found on page 338 marked Windsor letter No. 5.

Letter from Windsor to Perkins, dated 3-7-05, found on page 340 and marked Windsor letter No. 6.

Letter from Windsor to Palmer dated 3-16-05 and found on page 354 and marked Windsor letter No. 7.

Letter from Windsor to Palmer dated 3-23-05 and found on page 370 and marked Windsor letter No. 8.

Letter from same to same, dated 3-24-05, found on page 373, marked Windsor letter No. 9.

Letter from Windsor to Perkins, dated 3-25-05, found on page 377, marked Windsor letter No. 10.

Letter from Windsor to Palmer, dated 4-10-05, found on page 400, marked Windsor letter No. 11.

Letter from same to same, dated 4-17-05, found on page 416, marked Windsor letter No. 12.

Letter from Windsor to Day Rubber Co. dated 4-19-05, found on page 422, marked Windsor letter No. 13.

Letter from Windsor to Palmer, dated 4-22-05, found on page 430, marked Windsor letter No. 14.

Letter from Windsor to Day Rubber Co. dated 4-24-05, found on page 434, marked Windsor letter No. 15.

Letter from Windsor to Palmer, dated 4-27-05, found on page 440, marked Windsor letter No. 16.

Letter from Windsor to Whitney, dated 4-29-05, found on page 446, marked Windsor letter No. 17.

Letter from Windsor to Palmer, dated 4-29-05, found on page 448, marked Windsor letter No. 18.

Letter from same to same, dated 5-4-05, found on page 458, marked Windsor letter No. 19.

Letter from same to same, dated 5-9-05, found on page 464, marked Windsor letter No. 20.

Letter from Windsor to Casein Mfg. Co. dated 5-9-05, found on page 464, marked Windsor letter No. 21.

Letter from Windsor to Perkins, dated 5-9-05, found on page 464, marked Windsor letter No. 22.

[fol. 841] Letter from Windsor to Palmer, dated 5-11-05, found on page 469 marked Windsor letter No. 23.

Letter from Windsor to Schield Mfg. Co. dated 5-12-05, found on page 472, and marked Windsor letter No. 24.

Letter from Windsor to Davol Rubber Co. dated 5-11-05, found on page 470, marked Windsor letter No. 25.

Letter from Windsor to Palmer, dated 5-16-05, found on page 482, marked Windsor letter No. 26.

Letter from Windsor to Perkins, dated 5-17-05, found on page, 693, marked Windsor letter No. 27.

Letter from Windsor to Palmer, dated 5-17-05, found on page 483 marked Windsor letter No. 28.

Letter from Windsor to Schield Mfg. Co. dated 5-19-05, found on page 485, marked Windsor letter No. 29.

Letter from same to same, dated 5-19-05, found on page 486, marked Windsor letter No. 30.

Letter from Windsor to Singer Mfg. Co. dated 5-19-05, found on page 487, marked Windsor letter No. 31.

Letter from Windsor to Palmer, dated 5-22-05, found on page 490, marked Windsor letter No. 32.

Letter from Windsor to Schields, dated 5-22-05, found on page 491, marked Windsor letter No. 33.

Letter from same to same, dated 5-25-05, found on page 500, marked Windsor letter No. 34.

Letter from Windsor to Day Rubber Co. dated 6-1-05, found on page 508, marked Windsor letter No. 35.

Letter from Windsor to Schield Mfg. Co. dated 6-5-05, found on page 517, marked Windsor letter No. 36.

Letter from Windsor to Meyer Bros. Drug Co. dated 6-12-05, found on page 528, and marked Windsor letter No. 37.

Letter from Windsor to Palmer, dated 6-12-05, found on page 527 and marked Windsor letter No. 38.

Letter from Windsor to Meyer Bros. Drug Co. dated 6-6-05, found on page 520, and marked Windsor letter No. 39.

Letter from Windsor to Day Rubber Co. dated 6-6-05, found on page 520, and marked Windsor letter No. 40.

Letter from same to same, dated 6-12-05, found on page 528, and marked Windsor letter No. 41.

[fol. 842] Letter from Windsor to Palmer, dated 6-19-05, found on page 542, and marked Windsor letter No. 42.

Letter from Windsor to Wilts Veneering Co. dated 6-19-05, found on page 543, and marked Windsor letter No. 43.

Letter from Windsor to Perkins, dated 6-19-05, and found on page 540, and marked Windsor letter No. 44.

Letter from Windsor to Wilts Veneering Co. dated 6-19-05, found on page 543, and marked Windsor letter No. 45.

Letter from Windsor to Palmer, dated 6-19-05, and found on page 544, and marked Windsor letter No. 46.

Letter from Windsor to Schield Mfg. Co. dated 6-22-05, found on page 552, and marked Windsor letter No. 47.

Letter from Windsor to Schield Mfg. Co. dated 7-8-05, found on page 569, and marked Windsor letter No. 48.

Letter from Windsor to Day Rubber Co. dated 7-11-05, found on page 574, and marked Windsor letter No. 49.

Letter from Windsor to Palmer, dated 7-22-05, found on page 589, and marked Windsor letter No. 50.

Letter from Windsor to Schield Mfg. Co. found on page 597, and marked Windsor letter No. 51, dated 7-31-05.

Letter from Windsor to Palmer, dated 8-3-05, found on page 609, and marked Windsor letter No. 52.

Letter from Windsor to Perkins, dated 7-31-05, found on page 519, and marked Windsor letter No. 53.

Letter from Windsor to Palmer, dated 8-3-05, found on page 609, and marked Windsor letter No. 54.

Letter from Windsor to Perkins, dated 8-4-05, found on page 614, and marked Windsor letter No. 55.

Letter from Windsor to Palmer, dated 8-9-05, found on page 611, and marked Windsor letter No. 56.

Letter from Windsor to Perkins, dated 8-10-05, found on page 624, and marked Windsor letter No. 57.

Letter from Windsor to Perkins, dated 8-14-05, found on page 622, and marked Windsor letter No. 58.

Letter from Windsor to Perkins, dated 8-19-05, found on page 644, and marked Windsor letter No. 59.

[fol. 843] Letter from Windsor to Perkins, dated 9-22-05, found on page 668, and marked Windsor letter No. 60.

Letter from Windsor to Schield Mfg. Co. dated 9-27-05, found on page 676, and marked Windsor letter No. 61.

Letter from Windsor to Palmer, dated 9-23-05, found on page 670, and marked Windsor letter No. 62.

Second Book—

Letter from Windsor to Palmer, dated 10-28-05, found on page 15, and marked Windsor letter No. 63.

Letter from Windsor to Green, dated 11-1-05, found on page 21, and marked Windsor letter No. 64.

Letter from Windsor to Perkins, dated 11-8-05, found on page 26, and marked Windsor letter No. 65.

Letter from Windsor to Schield Mfg. Co. dated 2-22-06, found on page 145, and marked Windsor letter No. 66.

Letter from same to same, dated 3-6-06, found on page 165, and marked Windsor letter No. 67.

Letter from same to same, dated 3-6-06, found on page 167, and marked Windsor letter No. 68.

Letter from Windsor to Perkins, dated 3-6-06, found on page 167, and marked Windsor letter No. 69.

Letter from Windsor to Schield Mfg. Co., found on page 177, and marked Windsor letter No. 70, dated 3-8-06.

Letter from Windsor to Palmer, found on page 179, dated 3-12-06, and marked Windsor letter No. 71.

Letter from Windsor to Schield Mfg. Co. dated 3-14-06, found on page 181, and marked Windsor letter No. 72.

Letter from Windsor to Waynesville Wood Mfg. Co. dated 5-7-06, found on page 230, and marked Windsor letter No. 73.

Letter from Windsor to Parker, dated 6-30-06, found on page 284, and marked Windsor letter No. 74.

Letter from same to same, dated 7-10-06, found on page 291, marked Windsor letter No. 75.

Letter from Windsor to Perkins, dated 3-29-05, found on page 384, and marked Windsor letter No. 76.

Letter from Windsor to Palmer, dated 3-25-05, found on page 385 and marked Windsor letter No. 77.

It is further stipulated and agreed that the paper hereto annexed marked by the Notary, "Walker Exhibit" is a true and correct transcript of the journal entries and the ledger entries in the regular books of accounts kept by the Walker-[fol. 844] Garetson Manufacturing Company, during the year 1905 and that the said entries were regularly made in said books on or about the dates stated in said exhibits.

It is further stipulated that the annexed paper, marked Tank invoice is a true and correct invoice for two tanks delivered by Walker-Garetson Manufacturing Company to the Poplar Bluff Plant of L. M. Palmer on or about April 1, 1905; and that the voucher thereto annexed is a true and correct copy of the original voucher now annexed to the original invoice, and that the same was made out in the regular course of business on or about the date thereon.

It is further stipulated that the papers hereto annexed and marked by the Notary, taking these depositions, Schields invoices, Nos. 1, 2, 3, 4, 5, 6 respectively are true and correct and complete copies of invoices for goods re-

ceived by Lowell M. Palmer shortly after the respective dates thereon, and that the vouchers annexed to said copies of invoices respectively are true and correct copies of vouchers attached to the original invoices and that said vouchers were made out on or about the respective dates appearing thereon; and that the goods to which said invoices and vouchers relate and which are described or referred to therein as "76-98 Soda," "Solvent" or "Soda" was commercial caustic soda.

It is further stipulated and agreed that the papers hereto annexed and marked by the Notary taking these depositions, Perkins Invoices, Nos. 1, 2, 3, 4, 5 and Perkins Voucher, are correct and complete copies of invoices for goods received by Lowell M. Palmer shortly after the respective dates thereon, and of the vouchers therefor; and that said voucher was signed by Nelson Windsor on or about the date thereon.

It is further stipulated that the papers hereto annexed and marked by the Notary, Perkins Letters Nos. 1 to 24, respectively, are full, true and complete copies of original letters now in the files of the Brooklyn Cooperage Company at the office of the Poplar Bluff Plant thereof; and that the said original letters were signed by F. G. Perkins and were received at the said plant in due course of the mails after the respective dates thereon.

It is further stipulated and agreed that the above mentioned copies of letters, telegrams, invoices, vouchers and papers shall be admissible in evidence in the trial of this case, and if introduced on behalf of either party they shall be received and used with the same force and effect as the original letters would have been received and used if duly [fol. 845] and fully proved. Such copies, however, shall be subject to correction at any time if error shall appear therein, it being the intention of this stipulation to waive all objections to the formal proof of such letters, telegrams, invoices, vouchers, and paper, but to reserve all other objections thereto.

It is further stipulated and agreed that the two copy books hereinbefore mentioned, and the invoices and vouchers, and the original Perkins Letters of which copies are herewith provided, are in the custody of the Brooklyn Cooperage Company, at Poplar Bluff, and that said Company shall retain the custody thereof.

It is further stipulated that the veneer heading department of the above mentioned plant, at Poplar Bluff, was shut down from about August 24, 1905, to on or about November 13, 1905, at which time it resumed operation; and that said department was again shut down from on or about the 8th day of August, 1906, until on or about May 5, 1907.

It is further stipulated and agreed that as early as the year 1905 considerable quantities of Cassava Flour (whether previously treated or untreated is left open to proof) were sold and shipped to said Palmer Plant, at Poplar Bluff, by Perkins or his Company for use in the preprartion of an adhesive for gluing up wood veneer in making barrel heading, and were so used at said plant, and that considerable quantities of the heading so made were shipped from said plant to be used in the making of sugar barrels and were actually used for that purpose, and that said Perkins received payment for said cassava flour.

It is further stipulated and agreed that as early as the year 1905, considerable quantities of Caustic Soda were shipped to the said plant at Poplar Bluff, to be used as solvent in the preparation of the adhesive used in making said sugar barrel heading, and that such caustic soda was so used; and that the barrel heading prepared with such adhesive was shipped out from the Palmer plant in considerable quantities.

It is further stipulated and agreed that in April 1905, Mr. F. G. Perkins was at the Poplar Bluff Plant of L. M. Palmer and at that time purchased rubber gloves for the men who were engaged in the handling of the veneered heading in the glue room and that thereafter the men used these gloves in and about their work and that from time to time thereafter new rubber gloves were bought for the purpose. [fol. 846] It is further stipulated and agreed that this stipulation shall be signed by counsel and returned by the Notary together with the copies of the papers mentioned herein under the certificate of said Notary.

Defendants' Exhibit Windsor Letter No. 1

Poplar Bluff, Mo., 2-21-'05

Lowell M. Palmer, Esq., 184 Front St., New York City.

Dear sir: Your telegram of this date reading as follows: "Wire what success you are having with the Perkins new glue" received, and I wired you as per enclosed copy. Perkins has been over the glue pot every day since his arrival, and I think he has succeeded in adapting his glue to our requirements. He made up a batch of glue on Saturday, the 18th instant with which we glued up several bales of heading, and these heads can scarcely be cut apart with an ax, holding much better than we have ever been able to make Casein, no matter at what ratio of glue to water we used. This was the first time he succeeded in getting an A. 1 adhesion, and we only kept an approximate account of the square feet covered per pound of this glue. On Monday he mixed another batch similar to what he did Saturday, the heads glue with which we will test this evening. He is mixing more today and I am keeping very close account of the glue and water used, and will be able to report very closely as to the covering qualities of this glue as compared to Casein. I stated in my telegram that I would wire you definitely Thursday, because I wished him to make at least three batches from this formula, so that by running all three through our presses, and keeping a close count on the result, I could by averaging the three, give you more accurately the information you requested in your wire. From all appearances, I think there is no doubt but what Perkins will give us a much better adhesive result, with the same covering qualities as the Casein, or the same adhesive result with a larger covering result.

Our equipment has been a considerable handicap for Perkins, but he has made no objections, nor any excuses, but pitched in and used what we had to the best advantage he could, with the results as given above.

Yours respectfully, Nelson Windsor.

[fol. 847] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 2

20 Paid. Poplar Bluff, Mo., 2-21-'05.

Lowell M. Palmer, 184 Front St., New York City:

Yours date. Adhesion A. one. Working on covering qualities which nearly equal Casein at present. Can wire you definitely Thursday. Writing.

Nelson Windsor.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 3

Poplar Bluff, Mo., 2-22-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Referring again to the success attained with the Perkins new glue.

I have made three tests in succession with this new glue, mixed according to the formula which Mr. Perkins worked out and pronounced O. K. The first test he made all measurements by weight with both glue and water, himself; handled the mixing himself, and adjusted the glue spreader for placing the amount of glue on the sheets in other words, handled the batch entirely himself. He placed a certain number of pounds of mixed glue in the spreader from which he glued a number of bales of heading, then carefully drew from the pot of spreader and weighed all the glue that was left, and gave me all the figures. I took his figures and calculated the covering capacity of his glue per pound, and found it to outspread Casein by 10%. The heads laid up with this first test, hold better than the heads glued with Casein on the same day.

The next test Mr. Perkins did the mixing, but I had our regular glue mixer do all the weighing of material, both glue and water, keeping a record of same for me. When the glue was mixed ready for using, I personally had it taken from the mixing kettle and weighed, then oversaw the handling of it through the glue spreaders and laying up eight bales of the heading, and personally weighed the [fol. 848] amount left in the glue spreader pot, which the rolls could not pick up. With these figures, I found the covering capacity to outspread Casein by about 10%, and

these heads 12 hours later held equally as well as those made with the first test.

The third test I had my foreman make entirely himself, Mr. Perkins giving him the formula. With his figures I found the covering capacity of the former tests substantiated, and the heads held as well as on the two former tests. The heads made with the first test, which were glued Monday, hold very much better now than they did 12 hours after being glued, showing that the glue improves in adhesive qualities as it gets older. Mr. Perkins lays much stress on the claim that his glue will hold much better 6 months after being used than it does a day or so after. I have had no chance to verify this claim, as he has only in the last four days succeeded in adapting his glue to our purposes with a satisfactory result. This glue has some advantages over the Casein as far as the handling of it is concerned. It is mixed cold and used cold, doing away with a substantial consumption of steam used in steam jacketed kettles, and making it very much easier on the hands of the boys. There is very little if any odor to it, and it can stand several days without souring or deteriorating as to adhesive qualities in the least. In two hours' time one man can mix any quantity according to the capacity of the tank, which can easily be large enough to contain one day's supply, and then be put at some other work, or in other words, it would cost me 35 cents per day to mix the glue, whereas with Casein it cost $3.25. The difference in the nature between the Casein and the Perkins glue, enables us to handle the latter from the spreader to the presses without splattering it on the floor, bolt racks, retainer racks, and other equipment in the glue room, as is done in the handling of the Casein, and owing to the lack of any offensive odor, one cleaning per week of the glue room would keep it in a better sanitary condition than six does with Casein, thus saving the necessity of having a man on every night to thoroughly clean the room, which costs me $2.00 per night. Mr. Perkins has given me the cost of this glue at Cairo, and figuring the same rate per pound on it as we pay on Casein from Cairo here, I have ascertained the cost of this glue laid down here at this point. I have therefore made a list of figures, which I herewith enclose, showing exactly the comparison as to the cost between the Casein and the

Cassava. The adhesive qualities of the cassava are better than those of the Casein, as formerly stated. I might add [fol. 849] that this new glue sets quickly enough that our present supply of retainers will handle our full capacity of heading, as well as when using Casein, and there is no reason why this glue cannot be used for our heading, if you so wish, as far as the tests and the length of time I have had for making same could show.

Yours respectfully, Nelson Windsor.

Encl.
C.

P. S.—The two tanks necessary to handle cassave would in no way interfere with our present equipment and one day's notice would suffice to change from one kind to another of glue.

Comparative Cost Sheet of Casein versus Cassava

| | |
|---|---|
| 100 lbs. Casein at 7¾c Cairo, plus 1 10c to Bluff | $7 85 |
| 10 lbs. Ammonia at 6 cts. at Bluff | 60 |
| Total per 100 lbs | $8 45 |
| 100 lbs. Cassave at 7-15 100c Cairo, plus 1 10c to Bluff | 7 25 |
| 25 lbs. water-proofing at 3 cts. delivered at Bluff | .75 |
| 10 lbs. Solvent at 3½c | 35 |
| | $8 35 |

Average run of glue per day 2,000 lbs.
10% saving due to increased spreading capacity.

| | |
|---|---|
| 200 lbs. at $8.35 | $16 70 |
| 2,000 lbs. at 10c per hundred saving in cost | 2 00 |
| | $18 70 |
| Present cost in handling Casein per day | 5 25 |
| " to handle Cassave | 75 |
| | $4 50 |
| Total saving | $23 20 |

[fol. 850] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 4

Poplar Bluff, Mo., 2-27-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I have expressed to you today several veneered heads laid up with the Perkins' new glue. I have also placed in Mo. P. car 19177 five bales of veneer heading paid up with this same material. The five bales are loaded in the doorway and are marked "Special" as per your request.

I have just received your telegram ordering the manufacture of box shooks dis-continued, and have complied with your request. I have some of this stock in the storage shed which is not matched or evened up, that is, different size shooks, having more sides than ends or tops and bottoms; others having more ends than sides or tops and bottoms, and others more tops and bottoms than sides and ends. I have just taken stock of these and am running through at present stock to match these up, in readiness for changing the thickness of material which you requested recently. I take it that you still wish this stock run through, in order to properly match the material in our storage shed.

Yours respectfully, Nelson Windsor.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 5

Poplar Bluff, Mo., 3-7-'05.

Frank G. Perkins, Esq., 30 Margin St., W. Newton, Mass.

DEAR SIR: Your favor of the 3rd as well as telegram of same date received and I wish to congratulate you on your success.

I have received instructions from Mr. Palmer to install the tanks and agitators necessary for handling your glue. I obtained prices on the tanks from a local manufacturer; these tanks to be 8 ft. in diameter and 7 ft. high, with parallel sides, having patent adjustable hoops of 2" select [fol. 851] cypress. This concern wanted only $110.00 for the two tanks. I have written today to two of the largest

tank manufacturing concerns in the country for prices on this size tank, and one of these concerns I asked for a quotation on a galvanized steel tank. Would it not be better, provided the price will justify, to install steel instead of wooden tanks?

When do you expect to be at the Bluff again? My reason for asking being that I am a little at sea regarding what we need in the way of equipment for handling the glue to the tank. My foreman Baker states that on one occasion you stated that the glue should be fed in gradually, and another time holus bolus, provided that the agitator was efficient, and the lower paddles swept the bottom of the tank pretty closely. If necessary to feed in gradually, we shall have to erect a hopper over each tank of sufficient capacity to mix a tank of glue, and put the required amount of glue in same for each mixing. Furthermore, with a tank of the dimensions which we will use here, and an agitator with a mixing paddle near the bottom of the tank, and one near the top, is it necessary that we design the agitator so that it can be lifted free from the mixture as you did with the small pot? Also, how often will it be necessary to clean these tanks, and how much trouble is it to clean same, that is, will filling the tank with water and heating same good and hot, and then draining this water out, clean the tank sufficiently? Of course having the agitator run while the water is heating. Again, would we obtain a better result in cooking this glue, by placing a pipe with small holes in the same, all around the bottom of the tank close to the staves, as per enclosed sketch? My reason for mentioning this being that you spoke of your glue being inclined to cook too rapidly right at the outlet of your steam pipe in the mixer.

Hoping for an early reply, I am,

Yours sincerely, Nelson Windsor.

C.

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[fol. 852] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 6

Poplar Bluff, Mo., 3-7-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Your favor of the 3rd instant received, and I note that you have contracted for our next year's supply

of glue from Mr. Perkins. I have written for prices on the tanks necessary to handle this new glue, and will install same as soon as possible.

I have used every precaution to keep out all strangers from the veneer department.

Yours respectfully, Nelson Windsor.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 7

Poplar Bluff, Mo., 3-16-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Your favor of the 14th instant enclosing duplicate B. L. and invoice for Perkins glue shipped from Lake Mary, Fla., received. I notice that the entire weight, namely, 59,700 pounds, is contained in only 254 bags, making a little over 230 pounds to the bag. It would facilitate our handling of this material a great deal if Perkins would put this glue in 100 pound bags at the most, in fact we will not be able to keep the required supply of this glue in our present storage room, if it is shipped in such large bags, because the sacks cannot be stacked to any height, unless we install some mechanical hoisting device.

Yours respectfully, Nelson Windsor.

C.

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[fol. 853] DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 8

Poplar Bluff, Mo., 3-23-05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Your favor of the 20th instant received, enclosing U. P. Holley's letter regarding visiting this plant, and a carbon copy of your reply. I am placing more "No admittance" signs in conspicuous places around the mill, and I think with good service on the part of our watchman, and alertness on the part of the foreman, we can keep the mill free from trespassers. I return herewith Holley's letter.

Referring to your second favor of the 20th instant, will say that Mr. Perkins arrived here on the 21st instant, and

he stated that he could and would have his glue placed in 100# bags.

Yours respectfully, Nelson Windsor.

Encl.
C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 9

Poplar Bluff, Mo., 3-24-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I enclose herewtih a letter received this A. M. from the freight traffic department of the Missouri Pacific Ry. Co. of St. Louis, regarding the classification of Casein glue stock.

The second car of Perkins' glue from Lake Mary, Fla., arrived in the Poplar Bluff yards on the 22nd instant, and the freight agent of the Iron Mountain at this point called me over the telephone regarding the nature of the contents of the car, in order to place a classification on same. Perkins had shipped it from Lake Mary and the R. R. Co. at that point had accepted it as flour, but the inspector of one of the R. R. Inspection Bureaus located at Cairo, Ill., called the Poplar Bluff agent's attention to the classification, re-[fol. 854] questing him to find out more definitely what was in the car. Perkins having interviewed the local agent at this point, and explained to him that his material had been and was being shipped to different parts of the country, over different lines, under the classification of flour, and that it resembled flour in appearance, the local agent reported to the Cairo inspector that it was a flour. In the local agent's conversation with me over the 'phone, he asked that if his word was called into question, would we confirm his statement, to which I replied, we would, on the present car. In a further conversation with the agent this morning, he told me that the Cairo Inspector was very desirous to do just what was right by us regarding the classification of this stock, but wished in self protection to learn, as nearly as possible, the nature of the goods he was classifying. To this end he had obtained a sample and forwarded same to a higher office of the Western Inspection Bureau.

I have written at length to explain the situation, and wish to be advised what answer, if any, to make to the agent at this point regarding this stock, if he should request information on the receipt of future cars.

Yours respectfully, Nelson Windsor.

Encl.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 10

Poplar Bluff, Mo., 3-25-'05.

F. G. Perkins, Esq., Lake Mary, Fla.

DEAR MR. PERKINS: Your letter from Memphis, Tenn., written during your enforced layover, received. We will hurry the tanks and mechanical agitators to completion as quickly as possible, and will, as per your request, wire you at Sanford, Fla., about two days before we are ready to do business.

I will have the glue from the second car, which is now in the Poplar Bluff yards, unloaded, and piled separately, according to the instructions given in your letter.

With kindest regards, I am,

Yours sincerely, Nelson Windsor.

C.

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[fol. 855] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 76

Poplar Bluff, Mo., 3-29-'05.

F. G. Perkins, Esq., Lake Mary, Fla.

DEAR SIR: The work on the tanks and mechanical mixers is progressing fairly well, and I expect to have everything in readiness for handling your glue by Wednesday of next week.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

P. S.—You might be here Tuesday morning.

DEFENDANTS' EXHIBIT WINDSOR LETTER No. 77

Poplar Bluff, Mo., 3-30-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Car A. C. L. 15493 containing Perkins' veneer glue has arrived and has been unloaded, and contents check according to the copy invoice made in your office March 11th. I return herewith the copy referred to.

Yours respectfully, Nelson Windsor.

Encl.
C.

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[fol. 856] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 11

Poplar Bluff, Mo., 4-10-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Your favor of the 5th instant with invoice and shipping receipt for a car of Perkins' glue enclosed, received.

I am unable to make any definite report on Perkins' efforts in making an oil glue or water proof glue. The contractors were slow in delivering the tanks for mixing this glue, and there was some delay experienced in getting the transmission machinery for handling the power agitators in these tanks. Everything is in working operation now, however, and we will mix the first day's run of Perkins' glue today. Mr. Perkins will begin making some water and oil proof samples tomorrow, and he assured me that I could report to you further in the course of a week.

I had a visit from the Casein Company's representative, Mr. Faichney, today. He appeared to be ignorant of the fact that you were purchasing glue from any other source than the Casein Co., and I did not enlighten him any on the subject. He spoke of your orders not coming in very fast recently, and I told him we had been manufacturing boxes, which required a smaller usage of glue, and also that we were not pushing the plant any on veneer heading, owing to a dull heading market. In answer to his inquiry I told him we had some three carloads of glue on hand (not stat-

ing the kind) and that as far as I knew, when any more of their glue was needed, they would receive the order in due time. As you have not stated whether or not you wished this company acquainted with the glue situation at this plant, I followed the policy of being cordial and pleasant with Mr. Faichney as on his previous visit here, in order not to arouse any suspicion, but at the same time gave him no information whatever regarding the situation. He seemed very anxious that we continue using their stock, leaving a sample with me of some which did not need the Ammonia as solvent, which they would sell at the same price per pound as that we have been getting. He also made me a personal offer to use my influence in continuing the purchase of their glue. Of course, you know the effect of such an offer, but I mention it so that you will under-[fol. 857] stand thoroughly just how far this company is willing to go. I have explained the situation as far as I thought advisable to my glue room foreman, and I have not the least doubt in the world but that I may depend upon him to refuse any and all offers, no matter how tempting, for any information whatever regarding our business. In installing the apparatus necessary for handling the Perkins glue, I have arranged it so that the foreman does the mixing himself, so that outside of him and myself, no one at the plant, outside of the office, is familiar with the handling or the nature of the glue we are using at present.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 12

Poplar Bluff, Mo., 4-17-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Your favor of the 13th instant received. I shall do my best to prevent any knowledge of the nature or make of the glue we are using at present, being obtained by any one outside.

Yours respectfully, Nelson Windsor.

C.

DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 13

16 Paid. Poplar Bluff, Mo., 4-19-'05.

Day Rubber Co., St. Louis, Mo.

Express black flexible rubber thumb and finger stalls for three pair hands requiring number eight gloves.

Lowell M. Palmer.

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[fol. 858] DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 14

Poplar Bluff, Mo., 4-22-'05.

Lowell M. Palmer, 184 Front St., New York City.

DEAR SIR: Your joint favor of the 19th, instant relative to our making some samples of 20½" x ¾" three ply veneer tight barrel heads, received.

The equipment with which we made the first tests of this new glue was very small and crude, and there have cropped up several slight difficulties, which have delayed us in abandoning entirely the use of the Casein and substituting the new glue. These have been practically all covered now, and we hope to use Mr. Perkins' glue entirely from Monday morning, the 24th, instant on.

The above will explain why I have been unable as yet to report any progress in the matter of a water or oil proof glue.

If, as we hope, we have succeeded in overcoming the little obstacles which usually delay the using of a new article, which from all I can gather in conversation with Mr. Perkins, this stock is, as far as the glueing up of the veneer is concerned, we will commence making some of the samples, as per your request of the 19th, by Wednesday, the 26th instant, and can ship by freight or express, as you request, one week from that date.

Mr. Perkins declares positively that there is no lime whatever used in connection with this glue of his, but there is an alkali of some description used, however, which has taxed our ingenuity to the utmost to prevent the cutting of the glue room men's hands. This alkali is contained in the solvent, which accomplishes the same purpose with his glue as Ammonia does with Casein, and Perkins states

that it is a soda product. If it were not for the fact that this substance is a powerful disinfectant, and the cut places on the men's hands heal quite rapidly, I do not think there is any doubt but what this glue would have had to have been abandoned. We have a very efficient equipment for handling and agitating this glue in the process of mixing, which has enabled Perkins to obtain a perfect solubility, with between 50% and 60% of the solvent that he has been accustomed to using, and this, of course, reduces the percentage of alkali in the entire mixture, and with the use of rubber finger stalls and an oiled canvas glove, which we have [fol. 859] succeeded in purchasing, the men are entirely satisfied to handle the glue of the mixture or nature which Mr. Perkins has succeeded in making it now.

As Mr. Perkins states that to obtain the required water or oil proof results the usual amount, if not a little more, of the solvent must be used, the question is going to come up whether or not the boys will be able to handle it. Perkins is very ingenious and is very anxious to give you a satisfactory result on these tight barrel heads, and I am hopeful that between the two of us that result will be obtained.

I wish, however, to place before you the difficulties which I know will confront us, so that you will understand any temporary setbacks or delays which may result from same.

Very respectfully, Nelson Windsor.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 15

Poplar Bluff, Mo., 4-24-'05.

Day Rubber Co., St. Louis, Mo.

DEAR SIRS: We are experiencing considerable trouble in protecting our employes hands who handle a glue containing a small percentage of a very strong alkali. We recently wired you to ship us some finger stalls, and same have been received and put in service. These stalls are O. K. as far as they go, but the mixture containing the alkali slops around so much that it gets inside the finger stalls. Can you furnish us a rubber glove of about the same weight as the darkest and most flexible finger stalls

you shipped us? If you have not a glove quite so heavy, we could use it, provided it was a loose fit on a hand requiring a number 8½ glove. If you have such a glove, please mail us three pair, and if same are satisfactory we will order more as we require them.

An early reply will oblige.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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[fol. 860] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 16

Poplar Bluff, 4-27-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I enclose herewith invoice and receipted expense bill for the Perkins glue stock contained in car Mo. P. 22736. The contents of the car checked alright with the invoice.

Yours respectfully, Nelson Windsor.

Encl.

C.

This glue is still being billed or classified as starch.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 17

Poplar Bluff, Mo., 4-29-'05.

Mr. Whitney, Supt. Singer Mfg. Co., Cairo, Ill.

DEAR SIR: Mr. F. G. Perkins of Lake Mary, Florida, who has been with us for some time, starting us aright in using his glue, informs us that you would like to visit this plant, and see the nature and handling of his glue stock. We will be pleased to show you at any time whatever in this line may be of service to you.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

[fol. 861] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 18

Poplar Bluff, Mo., 4-29-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Your joint favor of the 25th. instant to Mr. Perkins and myself and also your favor of the 26th instant, received.

We have been running Perkins glue exclusively now for one week, and I think I am safe in saying we will experience no further serious trouble in handling this glue as mixed for the sugar or slack barrel heads. This having been accomplished, Mr. Perkins will commence this coming week working on the tight head proposition.

As instructed in your favor of the 26th instant, I have written Mr. Whitney as per enclosed copy.

I also enclose herewith a communication received at this office this A. M.

Yours respectfully, Nelson Windsor.

Encl.
C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 19

Poplar Bluff, Mo., May 4, 1905.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Your several favors of the 2nd. instant received. I shall make shipment at once of all the empty Casein bags we have on hand, shipping and invoicing them as instructed in the letter copy which you enclosed.

The logs coming from the woods at present will admit of about 250 boxes being made daily, and this quantity I can commence making within a week or ten days, without interfering with the output of the plant. Your favor of February 17th. last called for both sides and ends of boxes manufactured in the future to be made ½" when dry, while you mentioned this thickness for ends only in your favor of the 2nd. instant. Shall I use Perkins glue in the manufacture of tops and bottoms? It is giving us a good result in the heading. We have about one half car of Casein on hand.

Yours respectfully, Nelson Windsor.

C.

[fol. 862] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 20

Poplar Bluff, Mo., 5-9-'05.

Lowell M. Palmer, 184 Front St., New York City.

DEAR SIR: We hand you herewith invoice and copy of B. L. 1577 empty Casein bags, which we have shipped to the Casein Mfg. Co., of Bainbridge, N. Y., as per their recent request. You will notice there were, in all 63 bundles of these bags; 61 bundles contain 25 bags each and two bundles contain 26 bags each.

Yours respectfully, Nelson Windsor.

Encl.
C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 21

Poplar Bluff, Mo., 5-9-'05.

Casein Mfg. Co., Bainbridge, N. Y.

GENTLEMEN: We hand you herewith original B. L. for 63 bundles of empty Casein bags; there are in all 1,577 bags; 61 bundles contain 25 bags each and two bundles contain 26 bags each. Invoice and copy of B. L. have been forwarded to our New York office.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Encl.
C.

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[fol. 863] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 22

Poplar Bluff, Mo., 5-9-'05.

F. G. Perkins, Esq., c/o Wright Hotel, Poplar Bluff, Mo.

DEAR SIR: We have on hand at present only 2½ barrels of Solvent, or about 7 or 8 days' run. Inasmuch as we do not know the address of the people from whom you order this in St. Louis, we suggest that you get a rush order off tonight, asking them to ship us two barrels per week for one month's time, or possibly just two weeks' time, and before the end of that period we can make permanent ar-

rangements with this company regarding the price of this commodity and the rate of delivery.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 23

Poplar Bluff, Mo., 5-11-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: The monthly expenses of the veneer side of the plant run unusually high, owing to the work done in the glue room in preparation for the handling of Perkins glue, and also on account of the purchase of a new log haul chain, about which I wrote you some time ago. We have not received all our paid bills, and I cannot therefore make an itemized statement of these unusual expenses. As soon as these are received I will send statement to you.

Yours respectfully, Nelson Windsor.

C.

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[fol. 864] DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 24

Poplar Bluff, Mo., 5-12-'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: Mr. Frank G. Perkins of Lake Mary, Fla., who has been with us for some weeks past, starting us in the use of his glue, has handed us your quotation addressed to him of the 9th instant on "76-98 soda" made up in ten ton lots to be taken out in 50 to 10 barrel lots at $2\frac{3}{4}$ c. per pound, F. O. B. St. Louis, same terms as heretofore. As we are to be the users of this commodity, we would be pleased to have you confirm this quotation to us, which is agreeable to Mr. Perkins. We refer you to James Stewart & Co. and the Medart Patent Pulley Co., both of which concerns are in your city, in regard to our standing, and hope you will see your way clear to make the terms 30 days net.

An early reply will oblige.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 25

Poplar Bluff, Mo., 5-11-'05.

Davol Rubber Co., Providence, R. I.

GENTLEMEN: We have received through a St. Louis jobber a leaflet showing cuts of rubber gloves and mittens which you manufacture. We have recently commenced using a glue in our veneer heading process which contains an alkali and cuts some of our employe's hands considerably. We have purchased through several St. Louis concerns, your half long, tan colored cloth or gauze lined rubber gloves, in sizes ranging from 9 to 12. These gloves give us the best service of any gloves we have been able to procure that would protect the men's hands from the cutting action of this glue. There is only one improvement that we can see could be made to this glove, and that is the palm and the fronts of the fingers might be reinforced with about as much again rubber as you place on them [fol. 865] at present, as practically all the wear comes from these portions.

Please let us know as early as possible whether or not you can re-enforce these gloves as suggested, and if so, what price can you quote us on same in 12 dozen lots, sizes running from 11 to 13.

Hoping for an early reply, we are,

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 26

Poplar Bluff, Mo., 5-16, 05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I enclose herewith receipted expense bill and invoice for Perkins' glue stock received in Mo. P. car 28207. The contents of this car checked according to the invoice.

I also enclose a statement made by Mr. Perkins for solvent, and also other materials used in tight barrel experimenting. The two largest items in the charges for tight barrel heading are for glue, of which he used but a small amount. The ten barrels of #3 glue (6176 lbs.) was intended in the first place for the ordinary sugar barrel heading, but he found that the could work to better economy with the glue for these slack barrel heads, without using the #3 glue, this he intends using on the tight barrel work, therefore, the charge against same. This statement of materials received here is correct.

Mr. Perkins made up some tight barrel heads, but the joint, although it may prove oil or water proof, still it was not strong enough, as far as the adhesive was concerned, to warrant placing the heads under a severe test. When we examined these heads, I advised him to not send same, but to make up some more. I am having the veneer made at present for another trial at these heads, and when Mr. Perkins returns here, which he expects to do at an early date, he will make up another quantity of these tight barrel heads.

Yours respectfully, Nelson Windsor.

Encl.
C.

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[fol. 866] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 27

Poplar Bluff, Mo., 5-17-'05.

F. G. Perkins, Esq., 210 8th St., Lincoln, Ill.

DEAR SIR: Your telegram of this date requesting me to ship to the Singer Mfg. Co., Cairo, Ill., 20 bags of glue, lot 68, classifying same as "glue stock," received. I will comply with your request by making shipment of this tomorrow, it being too late now to engage a drayman today.

Referring to the matter of my Father's taking an agency from you to sell your glue, about which we have had several conversations, I believe all the doubtful points once in my mind as to the quality and economy and practicability in the handling of your glue have been overcome, and I think if

my Father is going to take up this work he ought to do so in the near future.

With your glue being handled successfully at this plant and also in all probability capturing the contract or contracts with the Singer people, there could not be a much better time selected for introducing same in the north. About how large a territory, say in states, would you wish him to handle the selling of your glue in? Regarding the commission or salary, will say I think it would be more satisfactory to him for you to state your terms in both ways, that is, if straight salary, with no expense allowed, what amount; if salary and expenses allowed, what amount; if commission with no expenses allowed, what per cent; if commission and expenses allowed, what per cent, and if part salary and part commission, with or without expenses, what amount and per cent?

I have not up to this time, for personal reasons, broached the subject to my Father, but will do so on the receipt of your answer to this letter. He is in a position to take up this agency within one week after its acceptance.

I wish to congratulate you on your success as spoken of by you in conversation over the telephone this afternoon, and I sincerely hope you will have no trouble in overcoming any little obstacles which may turn up in the usage of this glue by the Singer people.

I have about completed a plan whereby we can at this plant remove at least 75% of the waste caused by the [fol. 867] glue slopping on the sheets while passing through the rolls. As you stated in conversation over the telephone, that you would not likely be here again for three weeks, I hope to have this plan worked out on part of the presses at least before you return.

With kindest regards from Mrs. Windsor and myself to you all, and wishing you continued success with your glue, I am,

Yours sincerely, Nelson Windsor.

C.

DEFENDANTS' EXHIBIT WINDSOR LETTER No. 28

Poplar Bluff, Mo., 5-17-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I enclose herewith copy of a letter I wrote Wm. Schield Mfg. Co., of St. Louis, for quotation on the solvent used with the Perkins glue, and also their reply to same.

We have, since using Perkins glue, been buying this solvent at 3¾c per pound from this company, as we have no contract for same, and Mr. Perkins states that 2¾ cents per pound is a very close price. We use, approximately 200 pounds of this solvent per day, so the saving made by purchasing it in carload lots would hardly warrant the risk of keeping so much on hand. Mr. Perkins stated to me that he was not positive that this solvent would hold its strength an unlimited time and it is much safer to handle it in quantities not exceeding ten barrels. A contract for ten tons would last us, at our present consumption of glue, about three months. Do you wish me to place this contract from this office, and also future ones, as our needs require? We can at any time determine the quality of this commodity we are receiving by having it chemically analyzed, so that any one furnishing us this solvent will in all probability, as this concern says, give us material of uniform quality. Mr. Perkins recommends the Wm. Schield Co. as a strong, reliable concern, from whom we will most likely get the best service.

Yours respectfully, Nelson Windsor.

Encl.
C.

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[fol. 868] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 29

25 paid. Poplar Bluff, Mo., 5-19-'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

Did F. G. Perkins order five barrels "76-98 soda" on ninth and has same been shipped. If so trace, if not when?

Lowell M. Palmer.

DEFENDANTS' EXHIBIT WINDSOR LETTER No. 30

9 paid. Poplar Bluff, Mo., 5-19-'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

Ship five barrels at once and bill to me.

Lowell M. Palmer.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 31

Poplar Bluff, Mo., 5-19-'05.

Singer Mfg. Co., Cairo, Ill.

GENTLEMEN: We shipped to you yesterday according to a telegraphic request made by Mr. F. G. Perkins, 20 bags of glue stock, containing 5,600 pounds, for which we enclose herewith original B. L.

If not asking too much of you, we would like to know what success you have had in trying this glue.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Encl.

C.

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[fol. 869] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 32

Poplar Bluff, Mo., 5-22-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Your favor of the 19th instant relative to the purchase of solvent for the Perkins glue, received. I will, as you request, order this material in five barrel lots.

Yours respectfully, Nelson Windsor.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 33

Poplar Bluff, Mo., 5-22-'05.

Wm. Schields Mfg. Co., St. Louis, Mo.

GENTLEMEN: We enclose herewith our check covering your statement of the 19th instant for five barrels (2,980 lbs. net) "87-98 Soda" at $2.75 per cwt.

You may enter our order for another five barrels to be shipped within two weeks' time.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Encl.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 33

Poplar Bluff, Mo., 5-25-'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: Your favor of the 23rd instant enclosing receipted bill for the five barrels of solvent, and stating that you had received a remittance from Mr. F. G. Perkins for the same amount, received. You may hold this check as payment for the additional five barrels ordered from you on the 22nd instant.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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[fol. 870] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 35

Poplar Bluff, Mo., 6-1-'05.

Day Rubber Co., St. Louis, Mo.

GENTLEMEN: We are not in a position to decide just what we need in the shape of gloves for our work yet, but will be writing you further in the course of a week.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 36

9 paid. Poplar Bluff, Mo., 6-5,'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

Has soda ordered May twenty-second been shipped? Rush.

Lowell M. Palmer.

DEFENDANTS' EXHIBIT WINDSOR LETTER No. 37

Poplar Bluff, Mo., 6-12-'05.

Meyer Bros. Drug Co., St. Louis, Mo.

GENTLEMEN: We have succeeded in purchasing from a St. Louis rubber house the brown colored cloth insertion regular Durol gloves, 6 pair #12 and 6 pair #13. When we have used this 12 pair we will know positively whether or not we will need any more of this style glove, and will then be in position to pass on your recent proposition, giving us prices on these gloves in 12 dozen lots, in the meantime, we are,

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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[fol. 871] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 38

Poplar Bluff, Mo., 6-12-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I enclose herewith receipted expense bill for the two cars containing Perkins' glue called for in the enclosed invoice. These two cars contained the 300 bags called for in the invoice and I have signed same.

Yours respectfully, Nelson Windsor.

Encl.
C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 39

Poplar Bluff, Mo., 6-6-'05.

Meyer Bros. Drug Co., St. Louis, Mo.

GENTLEMEN: We have found in our tests so far that it is necessary to use a canvas glove over any rubber gloves we have been able to secure yet, and therefore we do not obtain a sufficiently better result from the re-enforced rubber glove over and above the unre-enforced to warrant our paying the difference in price.

Please let us know if you can express us at once, 12 pair of half long brown colored cloth insertion regular Duvol gloves, six pair to be #12 and six pair #13.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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[fol. 872] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 40

Poplar Bluff, Mo., 6-6-'05.

Day Rubber Co., St. Louis,. Mo.

GENTLEMEN: We have found in our tests so far that it is necessary to use a canvas glove over any rubber glove we have been able to secure yet, and therefore we do not obtain a sufficiently better result from the re-enforced rubber gloves over and above the unreinforced to warrant our paying the difference in price.

Please let us know if you can express us at once, 12 pairs of brown colored cloth insertion regular Duvol gloves, six pairs to be #12 and six pair #13.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 41

Poplar Bluff, Mo., 6-12-'05.

Day Rubber Co., St. Louis, Mo.

GENTLEMEN: Please enter our order for 12 pairs of men's tan rubber gloves, 6 pair to be #12 and 6 pair to be #13, these gloves to be of the regular Duvol brown colored cloth insertion.

Replying to your favor of the 7th instant will say that the men who wear these gloves handle rough edge veneer sheets, both with and without glue on them, and we have found it necessary to wear a canvas glove over the rubber glove. These canvas gloves we purchase from different sources, and they only answer as a protection to the water or liquid proof rubber glove. These canvas gloves cost

from 7 to 8c per pair and by using them when a pair becomes worn on the fingers, they are thrown away with very little loss, whereas if we attempted to use a rubber glove, if you could cover same with some kind of canvas, when this canvas was worn through there would be nothing to protect the rubber and it would be only a short time until the entire glove would have to be thrown away.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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[fol. 873] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 43

Poplar Bluff, Mo., 6-19-'05.

Wilts Veneering Co., Plymouth, N. C.

Attention Mr. Conway Newman

GENTLEMEN: Your favor of the 16th instant by Mr. Conway Newman, your superintendent, with letter from Mr. Lowell M. Palmer enclosed, received. I have just wired you as per enclosed copy.

Mr. Palmer has quite a veneer plant at this point and there is no doubt that you will, as he states, be well repaid for your visit.

I return herewith Mr. Palmer's letter to you.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Enc.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 42

Poplar Bluff, Mo., 6-19-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: In checking the last invoice for Perkins glue rec'd at this plant, I made in order to get the expense bill from the R. R. Co. as quickly as possible check according to the amount which they 'phoned us and the expense bills were gotten from the agent in town and enclosed in the

letter, without my seeing same. We have just received copies of these expense bills and I find that there are two errors, one in the weight and the other in the extension. The Perkins invoice on this shipment of glue called for 60,000 pounds and the R. R. Co's expense bills call for 66,000 pounds. This shipment of glue contained 300—200# bags, and we have up to the present time found Perkins' weight correct. This last shipment of glue reached us in two cars and we got two expense bills from the R. R. Co. These expense bills are similar as to weight and rating, but on one they make a charge of $59.40 and the other $54.00. I suppose you have noticed that they are billing this glue stock [fol. 874] to us as "Cassava Starch" and rating it accordingly.

Yours respectfully, Nelson Windsor.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 44

Poplar Bluff, Mo., 6-19-'05.

F. G. Perkins, Esq., c/o Halliday House, Cairo, Ill.

DEAR PERKINS: Your favor of the 13th instant received, and I am sorry that this answer has not been sent sooner, but the delay was unavoidable.

Regarding the lessening of the pressure of our accumulator, will say that we found that with any less pressure than we are using we could not bolt the heading in the retainers. We are getting a much better result from this glue now than when you were here last, owing to the fact that we have been able to get a better action from the solvent by the method of which I spoke to you, namely, using some 10 to 25% of the necessary water in mixing just at the time we introduce the solvent.

There is no suggestion that I could make regarding the conditions at Cairo with the 15⅜" diameter by 18" in length rolls, other than that you mix the glue as regards proportions between glue and water, very heavy, but at the same time with the quality or kind of your glue that will make it as fluent as possible; then by good stout springs above the upper rolls, force the rolls to feed the stock through prop-

erly, at the same time getting on approximately the same amount of mixture as you would if the proportion were made with more water and less glue, thereby adding considerably to the sheet the amount of adhesive qualities.

I have a little more interesting news for you on your return to the Bluff.

Yours sincerely, Nelson Windsor.

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[fol. 875] DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 45

Poplar Bluff, Mo., 6-19-'05.

Wilts Veneering Co., Plymouth, N. C.

Attention Mr. Conway Newman

GENTLEMEN: Your favor of the 16th instant by Mr. Conway Newman, your Superintendent, with letter from Mr. Lowell M. Palmer enclosed, received. I have just wired you as per enclosed copy.

Mr. Palmer has quite a veneer plant at this point, and there is no doubt that you will, as he states, be well repaid for your visit.

I return herewith Mr. Palmer's letter to you.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Encl.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 46

Poplar Bluff, Mo., 6-19-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Replying to your favor of the 15th instant regarding the unusual warp in the thick veneer for the box sides and ends received by you recently, will say that I think the sides and ends that are troubling you are those that have been stored at the plant, some in the storage shed trimmed and baled and others wedged under our stacking frames untrimmed. I may be mistaken in this con-

clusion, however, and will steam the blocks from which I cut the sides and ends more in the future than I have in the past, although we are about at a limit along this line, as the blocks with too much heat are so soft in the center that the wood will not stand the strain of the chuch in cutting this heavy veneer. I will go just as far along this line as I possibly can.

Yours respectfully, Nelson Windsor.

C.

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[fol. 876] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 47

Poplar Bluff, Mo., 6-22-'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: We are enclosing a check covering your invoice of the 14th. instant for five barrels of "76-98 soda." You may enter our order for 5 barrels more of this material to be shipped in about two weeks. Please attach original B. L. to your invoice so we can, as you call for in your invoice, mail you a check on receipt of same.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Encl.
C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 48

Poplar Bluff, Mo., 7-8-'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: We have your statement of the 7th instant and enclose herewith our check to cover same. We would have paid this sooner but have never received an invoice from you. Please make duplicate invoice and attach to enclosed receipt and return to us.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Enc.
C.

DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 49

Poplar Bluff, Mo., 7-11-'05.

Day Rubber Co., St. Louis, Mo.

GENTLEMEN: We would be pleased to have you express us 12 pairs of the Duvol Rubber Gloves same as we purchased from you recently, 9 pair number 12 and 3 pair number 13.

An early shipment will oblige.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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[fol. 877] DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 50

Poplar Bluff, Mo., 7-22-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: Enclosed please find O. Kd. invoice and receipted expense bill for Perkins' glue received in car S. P. 83689.

Yours respectfully, Nelson Windsor.

Encl.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 51

Poplar Bluff, Mo., 7-31-'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: We wish to thank you for your favor of the 26th instant. Inasmuch as we intend closing down ourselves in a few days for some time, we are not in need of any soda at present. We will advise you of our requirements well in advance of same, when we again start up.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

DEFENDANTS' EXHIBIT WINDSOR LETTER No. 52

Poplar Bluff, Mo., 8-3-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I have just wired you night rate as per enclosed copy. We received the first car referred to about three days ago, and thinking that no doubt an invoice from your New York office would reach here shortly to be checked according to the contents of the car, I unloaded it. Today, however, we find a still large car of this glue in our yard, [fol. 878] and as we already have a large quantity of this glue on hand, I thought it best to wire you for instructions.

Yours respectfully, Nelson Windsor.

Encl.
C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 53

Poplar Bluff, Mo., 7-31-'05.

F. G. Perkins, Esq., 121 51st St., Cor. Monroe Ave., Hyde Park, Chicago, Ill.

MY DEAR PERKINS: Your favor of the 14th, 22nd and 26th received.

Very sorry to learn that Mr. Palmer is not well, but glad to know that you obtained an interview.

I thank you for your kindly suggestions asd expressions in your favor from Norfolk, Va.

Hope you have had success with the Wilts veneer people in your interview with their manager at Richmond.

I have not overlooked the turning of the tight barrel heading spoken of in your favor of the 26th. instant from Louisville. The department from which these heads are turned will be in operation for several months yet, but I will have the heads turned this coming week, so that if you request any of them sent to you as per conversation before you left, I can do so. You remember I promised to send you some samples for a grand stand play to the trade that would pull the fiber in good style. I am mailing you some under separate cover, which were covered at the rate of about

55 to 60 square feet. These were glued up from a batch made from experimental mixture on the third flat, consisting of 25# heavy body, 2½# solvent and 100# water, and used on these samples immediately after it was finished. With Baker's help I have inaugurated a system of testing our stock regarding, first, the batch from which it is glued up; second, the spreader the glue is put on by; third, the number of hours in the retainers, and last, but not least, the time that the glue has stood after being finished, before it has been applied to the stock. This testing has convinced me that the sooner after being finished the glue is used, the beter adhesion is obtained. This statement is based on the fact obtained from testing these heads, and there is no doubt in my mind at all that it is absolutely correct. As the reason for this fact I find by examining the stock carefully, that the glue used shortly after being finished does not pene-[fol. 879] trate the veneer half as much as that which has stood from 24 to 36 hours. My attention was called to this peculiarity in the glue, or action of the solvent, by having to stand a partial batch of this glue over 72 hours. The heads made from this glue after standing that length of time, were about the worst we have glued up since we commenced using your glue. I am arranging now to mix a large batch of this glue and finishing same in the morning by getting a real early start and running a part of same in the afternoon of the same day; then I will let this glue stand in the tank for two days, and run some more stock from it. I will then saw up some of the heads and send you samples, and I think if you make a close inspection of them you will readily agree with the above. The above finding, however, only confirms the point we have always been raising, namely, that if your glue can be kept in the joint, and not sent half way through the veneer, we will get an A. 1 result with a large covering surface.

Hoping you have enjoyed your trip and that this finds both Mrs. Perkins and yourself enjoying splendid health, I am with kindest regards from both Mrs. Windsor and myself,

Yours sincerely, Nelson Windsor.

DEFENDANTS' EXHIBIT WINDSOR LETTER No. 54

Poplar Bluff, Mo., 8-3-'05.

35 Red Paid.

Lowell M. Palmer, 184 Front St., New York City:

Two cars glue loaded partially in barrels and partially in sacks received in our yards and I have no instructions, invoice or bill of lading for same. Please advise what disposition you wish made of same.

Nelson Windsor.

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[fol. 880] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 55

Poplar Bluff, Mo., 8-4-'05.

31 Paid.

F. G. Perkins, 121 E. 51st St., Chicago, Ill.

Have received two carloads glue without invoice, bill of lading or written instructions. Wired New York as to disposition and received reply to unload two cars. Are you going to ship any more?

Nelson Windsor.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 56

Poplar Bluff, Mo., 8-9-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I received this A. M. your favor of the 7th inst. enclosing invoice and B. L. covering the Perkins glue contained in cars L. S. & M. S. 42690. For some reason this glue was transferred enroute and arrived here in two cars. Although these two cars contained the requisite number of barrels and bags called for by the invoice and B. L. yet I can only report 67,428 pounds as against 69,539 pounds called for in the invoice.

In checking this glue as it arrived I accepted all the weights as they were marked on both the bags and the barrels, all of them being marked with the exception of 77 bags.

These 77 bags I weighed carefully and gave Perkins credit for the actual weight.

Enclosed please find expense bill for L. S. & M. S. car 42690, freight $238.14 and L. S. & M. S. car 24344, freight $169.83.

Yours respectfully, Nelson Windsor.

Encl.
C.

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[fol. 881] DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 57

Poplar Bluff, Mo., 8-10-'05.

F. G. Perkins, Esq., 121 E. 51st St., Chicago, Ill.

DEAR PERKINS: Referring to your favor of the 6th instant on the subject of the cars of glue received here recently, and about which I wired you, first, the car shipped from Lake Mary on July 6th was received on about July 20th and mailed to the New York office the O. K.d invoice and receipted expense bill for same. I am surprised you have not heard from there regarding same before this date, but think the delay has been caused by the absence from the office of the auditor, G. Fred Royce.

Second, the L. S. & M. S. car 42690 for some reason or other was lightened before it arrived here. This car came into our yards but contained only a portion of the glue originally placed in it. We have since that time, however, received the remainder in another car. There was a slip somewhere along the line and I did not receive the invoice or original B. L. for this material until yesterday, but immediately upon its receipt, I checked the invoice and forwarded same with the receipted expense bill to the New York office. I could not make the contents of these two cars check according to your invoice, although the requisite number of sacks and barrels called for in the B. L. came in the two cars, and in checking them I credited you with the weights as marked on these bags and bbls. I found 77 sacks in all which had no marks on them, 19 of these weighed in the neighborhood of from 95 to 100 pounds—one weighed 200 pounds, and the remaining 57 weighed between 240 and 250 pounds. My checking showed 2,111 pounds

short. I have kept all these pkgs. intact and am not using same, and if I have been mistaken in tallying, the goods are here for re-checking.

I have since wiring you about this glue received word from Mr. Palmer to check and unload two, or possibly three cars of your glue—L. S. & M. S. 42690 being one of them. If you will advise me when the shipment of the next and last car is to be made, it will enable me to get a report on same to the New York office much quicker than I was able to do on this last car.

We are running on logs and poles taken from the bottom of the slough, which is at best very slow work, and [fol. 882] it will be a matter of from three to six weeks before all this timber is entirely used.

Yours sincerely, Nelson Windsor.

C.

Kindest regards to Mrs. Perkins and yourself.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 58

Poplar Bluff, Mo., 8-14-'05.

F. G. Perkins, Esq., 212 E. 51st St., Chicago, Ill.

DEAR SIR: Your two favors of the 11th and 12th instant relative to glue contained in L. S. & M. S. car 42690 received. I regret very much that you did not furnish me with the information contained in these two letters, before this car was received, as it would have prevented the extra correspondence and contradictions of the first checkings, which is now necessary to the New York office from this office. Lacking the information contained in these letters, we tallied the cars as follows: in car L. S. & M. S. 42690 there were 74 barrels, which netted 22,022#; 76 bags, 57 of which weighed from 233 to 248#, and 19 of which weighed from 87 to 102#, the total bags netting 15,347#.

The second car, L. S & M. S. 24344 contained 145 bags, which we accounted at 200# each, totaling 29,000#; three barrels weighed 746#, and one bag weighed 113#. The two cars totaled according to the above, 67,428#.

Since receiving your letters I weighed a number of the 145 bags which we allowed 200# for, and found them to average 213# net. This makes 1,885# glue to your credit. As our tally was 2,111 short of yours, this still leaves 226# to be accounted for. We only found 19 of the 20 bags which you sent at 100# net, and by checking over our weights on the barrels, our figures show 16# shortage; then the one bag which you have marked 190# we found to weigh only 113#. This still leaves 33# which I cannot account for, except that there must have been a difference in our weights as to the 19 bags, which you state average 100# each.

I have checked the contents of these two cars myself, and outside of the 13# per bag of the 145 bags, I cannot find anything wrong with the count of my unloader.

[fol. 883] Before reporting again to the New York office on these cars, I would like to know if the count as laid out in this letter will stand.

Yours truly, Nelson Windsor.

C.

Mrs. Windsor joins me in sending kindest regards to Mrs. Perkins and yourself.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 59

Poplar Bluff, Mo., 8-19-'05.

F. G. Perkins, Esq., 121 E. 51st St., Chicago, Ill.

DEAR SIR: Enclosed please find check covering the invoices received from you on several different dates for solvent, gloves, glue, etc.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Encl.

C.

DEFENDANTS' EXHIBIT WINDSOR LETTER No. 60

Poplar Bluff, Mo., 9-22-'05.

F. G. Perkins, Esq., Lake Mary, Fla.

DEAR SIR: As requested in your favor of the 9th inst. we enclose herewith B/L for N. Y. Co. car 91591.

Please excuse the delay as the person who had charge of these B/L has been away on his holidays, and had all these papers locked up in his desk.

Yours truly, Lowell M. Palmer, by Nelson Windsor.

Encl.

G.

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[fol. 884] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 61

Poplar Bluff, Mo., 9-27-'05.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: Replying to your inquiry of the 26th instant will say that we will not be in the market for any soda for about one month, and on commencing operations we will not be, for some time, using more than 50% of what we did previously.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 62

Poplar Bluff, Mo., 9-23-'05.

Lowell M. Palmer, Esq., 184 Front Street, New York, N. Y.

DEAR SIR: Your favor of the 19th inst., by Mr. Royce regarding the amount of glue reported to have been put in tops and bottoms, has been forwarded to me at Ironton.

I have looked the matter up and find that the foreman in charge of the glue room turned in the wrong account of glue as to what went into boxes and what went into heading. Taking into account the number of square feet covered by a pound of glue in making tops and bottoms I find that

we used about 2,650 lbs. to make up the 1,820 pairs of finished stock and the 5,000 pairs of stock in the retainers.

It is impossible to get accurately the number of pounds that are used in boxes and heading separately as glue out of the same tank is used for both and the foreman in turning in his report made a mistake somehow, but as he is away I don't see how he came to do it.

I enclose corrected statement of glue used.

Yours respectfully, Nelson Windsor. G.

G.

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[fol. 885] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 63

Poplar Bluff, Mo., 10-28-'05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I have a request from the local agent of the Iron Mountain R. R. Co. to furnish him with a copy of the weights, as settled for with the shipper of L. S. & M. S. car 42690, which was shipped from New York containing Cassava Starch. I wrote you regarding weights of this car on August 19th, 1905. They ask for this information in settlement of a claim.

Yours respectfully, Nelson Windsor.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No. 64

Poplar Bluff, Mo., 11-1, '05.

J. S. Green, Agt. I. M., Poplar Bluff, Mo.

DEAR SIR: Replying to your favor of October 25th, will say that we made settlement with the shipper for the Cassava Starch contained in L. S. & M. S. car 42690 for 69539 pounds.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 65

Poplar Bluff, Mo., 11-8-'05.

F. G. Perkins, Esq., Care Roanoke Hotel, Plymouth, N. C.

DEAR MR. PERKINS: Your favor of October 29th was received in due time, and should have answered it sooner but being very busy and having had a general Malarial "shake-up" has caused the delay.

[fol. 886] I have noted carefully all you say about the proportions you have tried there in mixing and the results you have obtained from same. A little later on I am going to re-arrange the mixers in our tanks, so that we can pull a mixture similar to what you are trying at Plymouth, and also fix our pipes so that they will take the glue to the machines. This, however, I will not do until I have demonstrated to my own satisfaction that our present spreaders will spread as heavy a glue as the proportion you mention is bound to make. If they will not, then I will take the matter up with headquarters of getting suitable spreaders to stretch this heavy mixture over the sheets, thereby obtaining a good adhesive result, and cutting down considerably the cost of our glue.

We started the mill again last Monday, and in ten days or two weeks will be going at a pretty good swing again.

I will enjoy very much hearing from you whenever you have spare time to write, and also value the suggestions and information which you pass along from your trials and tests.

Mrs. Windsor joins me in sending regards to both yourself and Mrs. Perkins.

Yours sincerely, Nelson Windsor.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 66

Poplar Bluff, Mo., 2-22-'06.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: We would be pleased to have you ship us by freight as soon as possible five barrels of your "76-98 Soda."

We wish to ask that in putting up this soda for us that you leave out the paper lining, as it is a great hindrance to us in using this commodity.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

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[fol. 887] DEFENDANTS' EXHIBIT WINDSOR LETTER No. 67

Poplar Bluff, Mo., 3-6-'06.

William Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: We have just wired you as per the enclosed copy. Our stock of this soda had run lower than usual before we gave you this order, on account of negligence of one of our employes. If the entire shipment of this soda has not already been made, or will not go out tomorrow, we wish that you would forward one barrel of this order by Pacific Express as soon as possible.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Encl.

Have frt. shipment if made tomorrow traced.

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10 paid. Poplar Bluff, Mo., 3-6-'06.

Wm. Schield Mfg. Co., St. Louis, Mo.

When will order February twenty-second be shipped? Wire reply.

Lowell M. Palmer.

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DEFENDANTS' EXHIBIT WINDSOR LETTER No 69

Poplar Bluff, Mo., 3-6-'06.

F. G. Perkins, Esq., West Newton, Mass.

DEAR PERKINS: Your interesting letter of the 28th ultimo receive. We are very glad to learn that Mrs. Perkins is improving, and sincerely hope that she is much better at the present time.

I am sorry that you had such a time of it at Plymouth, but from what Baker told me of the methods of business, I am rather surprised that you have been able to do anything at all at that point. I wish you every success in your effort to have your glue used among the thin veneer or [fol. 888] cabinet workers, but from what I note here of the solvent penetrating, I believe you will have a little trouble in preventing this solvent from staining the veneers.

We have not been able to cover quite as much surface with the same adhesion during the winter months that we did last summer, and now that the weather is warming again, the covering surface begins to increase with no apparent deterioration in the holding of the glue. There is a small amount of glue in sacks which you sent to us about your last shipment, the addition of about 10% of which to the glue we were making up in each batch, gives us a much better result than we have ever been able to obtain, and I think when the weather moderates sufficiently we will be able to cover much more surface with a sufficient adhesion, than we have been able to accomplish yet. This glue in bags spoken of above seems to give the batch a shortness and thus prevents penetration, which we have not been able to obtain in any other way.

I expect within one month to re-arrange our mixing tanks, according to what our experience since their first installation has shown us to be a better plan. We will raise these tanks about two feet above the floor they are resting on at present, will make them shallower by taking about one foot off the top, will put in a much more powerful and effective mixing device, and will use a 6″ main and 4″ feeds to the presses. The main will be located between the bottom of the tank and the upper floor, and the leads to the presses will run direct from the Ts in this main in a straight line at an angle of about 45 degrees, to the spreaders. I will put a valve in the bottom of the tanks of our own design, which will be made in this city, so that the glue will not have to dodge around any corners whatever between the tank and the spreaders. At the spreaders I will use what is termed a "quick opening gate valve" of very light design, which, when opened, will give a straight outlet to the full capacity of the 4″ pipe. I believe then that we can pass almost any old thing from the tanks to the spreaders,

so that we may experiment to our heart's content on a very heavy mixture. This will enable us to cut out a large amount of the water we are using at present, and by doing this will be able to prevent a great deal of the present penetration.

As we have been using only one spreader in the gluing of the small amount of heading and box tops and bottoms we are manufacturing at present, we have had no serious trouble in getting through the pipes to this one press, a much heavier mixture than we ever used while you were [fol. 889] here, and we have not as yet experienced any trouble in getting our spreader to take the sheets through with a stiffer glue.

I conveyed your message to Mrs. Windsor, and she wishes me to thank you and Mrs. Perkins for your kind expressions, and asks me to convey to you both her best wishes, and hopes that Mrs. Perkins will soon be herself again.

Hoping to hear from you at an early date, I am,

Yours sincerely, Nelson Windsor.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 70

Poplar Bluff, Mo., 3-8-'06.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: We have your invoice for five barrels of "76-98 Soda" which you shipped yesterday. We note that you have increased the price of this soda from $2.75 to $2.85 per hundred. Although no signed contract was entered into with you for this commodity, yet you stated when we first commenced purchasing same from you that you could furnish it at $2.75 per hundred, and we thought possibly the increased charge on this invoice was an oversight.

Please let us hear from you in regard to the above and oblige,

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 71

Poplar Bluff, Mo., 3-12-'06.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I enclose herewith a communication received this morning relative to the Perkins glue. I am forwarding same to you as I was not sure what information you would authorize me to give this man.

Yours respectfully, Nelson Windsor.

Encl.
C.

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[fol. 890] DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 72

Poplar Bluff, Mo., 3-14-'06.

Wm. Schield Mfg. Co., St. Louis, Mo.

GENTLEMEN: We have your favor of the 9th instant relative to the increased charge on the "76-98 Soda," and note what you say regarding same. We are enclosing herewith check to cover the amount of your invoice.

Yours very truly, Lowell M. Palmer, by Nelson Windsor, Asst. Supt.

Enc.
C.

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DEFENDANTS' EXHIBIT WINDSOR LETTER NO. 73

Poplar Bluff, Mo., 5-7-'06.

Waynesville Wood Mfg. Co., Waynesville, N. C.

GENTLEMEN: Your favor of the 3rd instant enquiring about the cold glue manufactured by Mr. Frank G. Perkins, received.

I have been using Mr. Perkins' cold glue at this plant for one year, gluing up three ply veneer for barrel heads and box shooks. For the class of work we are doing, I obtain a sufficient adhesive result in covering from 65 to 70 square feet per pound with this glue. We have never

used hide glue extensively in our work, but in the tests made, 40 to 45 square feet with a 9c glue was about the best result we could obtain. This spread with the hide glue gave a very good adhesive result, but I have found by test, that 50 to 55 square feet of spread with the Perkins cold glue gave practically as good an adhesive, in other words, one pound of the Perkins cold glue accomplished the same result as 1¼ pounds of the 9c hide glue.

I have found Mr. Perkins' glue to stand atmospheric changes better than anything I have ever seen or used in the glue line, outside of expensive water-proof glues.

Hoping that this information will prove of service to you, I am,

Yours very truly, Nelson Windsor.

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[fol. 891] DEFENDANTS EXHIBIT WINDSOR LETTER No. 74

Poplar Bluff, Mo., 6-30-'06.

R. M. Parker, Esq., President Brooklyn Cooperage Co., 184 Front St., New York City.

DEAR SIR: Enclosed please find express receipt for a package containing 5 veneer heads, which I have forwarded to you today. On examination you will find that the sheet on one side of each head is defective, because the timber is decayed. This timber is decayed because of the spoiling of the ends of the logs in the woods, which usually takes place, to a certain extent, at this time of the year. We have always, heretofore, used such defective sheets in the veneered heads, but have always shipped same to the Brooklyn factory. Inasmuch as the heading which I am making is being shipped to Goepper Bros. Co., whom I take it are customers, it has occurred to me that they might possibly object to heads with sheets the same as the samples show, being put into them, and I, therefore, forwarded these heads to you for your decision, and am keeping this defective timber separate, that is not putting it in the stock being manufactured for Goepper Bros. Co., until I hear from you. If you wish, this defective timber can be worked into box shook tops and bottoms, the same

way as we work it in the heading, thereby handling it ourselves.

As early a reply as possible would save me the expense of a continued separation of this defective stock from the good.

Yours respectfully, Nelson Windsor.

P. S.—These decayed sheets if put in center weakens head too much.

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[fol. 892] DEFENDANTS EXHIBIT WINDSOR LETTER No. 75

Poplar Bluff, Mo., 7-10-'06.

R. M. Parker, Agent, 184 Front St., New York City.

DEAR SIR: Referring to your favor of the 2nd instant relative to the disposition of defective decayed sheets, which I am getting in the manufacture of three ply heading. I have discussed the matter thoroughly with Mr. Langlotz, and he recommends using the defective sheets as the middle or center sheet of the heads.

To complete Goepper Bros. Company's contract of 19⅛" veneer heading, I must still make 80,000 set. If we were allowed to make 10,000 or 12,000 set of 19-1/16" for Brooklyn, along with this, all the defective stock can be taken care of without sending any to Goepper Bros. Co.

In order that I do not give you a wrong impression regarding the amount of spoiled timber we have, I should say that all the large decayed timber is being used in the manufacture of veneer heading, which makes the percentage of the spoiled timber to the un-spoiled being used in the veneer heading alone, large. The percentage of the spoiled timber in comparison to all the large timber I am manufacturing into both boxes and veneer heading, is somewhat under 4%.

Yours respectfully, Nelson Windsor.

[fol. 893] UNITED STATES DISTRICT COURT, NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION

No. 127. In Equity

PERKINS GLUE COMPANY, Complainant,

vs.

SOLVA WATERPROOF GLUE COMPANY, BURCH-KANE COMPANY, LOWELL R. BURCH, and THOMAS B. KANE, Defendants

STIPULATION RE CERTAIN EVIDENCE, ETC.

It is hereby stipulated by and between the parties to the above-entitled cause for the purposes of this suit only, that the annexed document is a true, full and correct copy of a letter-press copy of a letter bearing the signatures of Lowell M. Palmer and Frank G. Perkins in one of the press-copy-books of Lowell M. Palmer now in the custody of the Brooklyn Cooperage Company at its New York office; and that said copy may be taken as a correct copy of the original letter and used in evidence as such by either party with the same force and effect as the original letter if duly produced and proved, subject to correction should error be found to occur.

It is further stipulated for the purposes of this suit only, that the debit s-de of the ledger of the Brooklyn Cooperage Company shows the following original entries:

May 22, 1905, to F. G. Perkins, 4450.33
June 9, 1905 to F. G. Perkins, 4491—
August 15, 1905, to F. G. Perkins, 4552.15
February 24, 1909, to F. G. Perkins, 4071.59.

And that said ledger is one of the regular books of original entry of the Brooklyn Cooperage Company, and that the above copy of entries may be used in evidence with the same force and effect as would be accorded said ledger if duly proved.

Gorham Crosby, of Counsel for complainant. John B. Macauley, Counsel for defendants.

[fol. 894] Mar. 3rd. 1905.

F. G. Perkins, Esq., 192 Fulton Street, N. Y. City.

Dear Sir: Referring to interview held with you in my office today, we have purchased from you and you have sold to us all of the wood working glue of your manufacture that we shall require in our business at Poplar Bluff, Mo. for the period of one year, at the price of 7 cents per lb. F. O. B. New York, or at the price of 7½ cents per lb. F. O. B. cars Cairo, Ills., with the understanding that the glue furnished is to do satisfactory work, that it is to surface not less than 70 square feet per pound, and make a sugar barrel head that is sufficiently adhesive to meet our requirements.

You can ship two carloads of glue immediately consigning it to Lowell M. Palmer, Poplar Bluff, Mo. via Cairo care of Iron Mountain R. R. at Cairo, Ills.

Yours truly, Lowell M. Palmer, President.

Accepted. *Accepted.* Frank G. Perkins.

Copy.

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Plaintiffs' Exhibit Baker Letter 11

Hotel Ill., Cairo, Ill., 11/14-06.

Mr. F. G. Perkins, South Bend, Ind.

Dear Sir: We are getting a long slow the tanks are about ready the Pipe fittings Havent came in yet the machine shop is crowded and it seams Hard to get any thing done the Machine Spreader is set up except that extra Piece of Casting that was broken in shiping and it was being drilled yesterday at noon i took sick yesterday morning and Havent been able to be up yet iff i dont get better by evening i will go over Home untill i do get better i Hate to do it but i think it will be the best i am to sick to write now

Yours respectfully, Frank Baker.

[fol. 895] PLAINTIFFS' EXHIBIT BAKER LETTER 12

Hotel Illinois, Edw. C. Allen, Proprietor

Cairo, Ill., 11/30 1906.

Mr. F. G. Perkins.

DEAR SIR: Your letter of the 28 just received and not-your desired changes in our formula and think it will be good, i will mix a batch to morrow morning 2 parts of #95 and 1 part 68 and 2¼-1 and advize you later as to results i Have tested the Pressure this afternoon as you sed and will Open them to morrow and save them for you.

I had a nice thanksgiving dinner and a good time Family is well and i am feeling prety good.

Yours truly, Frank Baker.

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PLAINTIFFS' EXHIBIT BAKER LETTER 13

Hotel Illinois, Edw. C. Allen, Proprietor

Cairo, Ill., 12/10 1906.

Mr. F. G. Perkins, South Bend, Ind.

DEAR SIR: We are getting on all right i am sending you a copy of the report of bodies turn out today and Mr. Summerwell thinks it is go good but i dont think it is good enough yet i think the mixture i am using now will be better

| | | |
|---|---|---|
| #95-240 \| | | |
| 83-200 \| | | |
| 68-280 \| | | |
| gum-280 \| | 560 | 900 |

mixed 2 ½-1-1% salvnt you no we have get only a small amount of 68 and gum and that is all the thin body that is Here and we will be compeled to use some lite body all the time i think 16 bags of 68 and probly 10 or 12 gum

I thought i would tell you this so you wouldent over look it Mr. barns says the tables or coming all right the machine is working fairly good the rolers dont seam to put

[fol. 896] on enough without opening up the glue Boxes two mutch that is i Have to Have a small roll of glue in front of the rolers in order to get a good spread and leave no Patches without glue
Hoping you are Having good success and good Health I am feeling fine i Have gained 8 lbs.

Yours truly, Frank Baker.

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PLAINTIFFS' EXHIBIT BAKER LETTER 14

Hotel Illinois, Edw. C. Allen, Proprietor

Cairo, Ill., 1/11, 1907.

Mr. F. G. Perkins, South Bend, Ind.

DEAR SIR: Not hereing from you for several days i feel some what uneasy about you i supose you are very buisy i found when i got here they had a batch made that was verry dark and running thin guy sed he had 2 or 3 the Same way while i was a way at P. B. So i seen the trouble at Once and took charge of the mixing my self and Stoped the trouble of Over Heating to mutch Heat Seams to Kill the glue and make it run thin So i took guy and showed Him just where to stop the Heat Which I Had done before but He dident seam to catch the Point. the old man west told me He told guy that He was making dat glue a Heap Hotter dan dat other man did
the blisters are running a bount 1 ¼ to 2% it seams the most of the blisters on fault of the glue occur on the corner of the table evidently not enough glue at that Point I see Mr. Pine and Mr. Bennett Have arrived Here and Have gone dident Stay verry long As usual sutch men dont pay mutch atention to small details you no if we change the other Press we will Have to Have a brick foundation built for they set on solid.
they Have a bout 30 bls. of glue on Hand
Mr. Whitney is able to be around the mill a gan
I am yours as ever

Frank Baker.

[fol. 897] PLAINTIFFS' EXHIBIT BAKER LETTER 15

Cairo, Ill., 2-14-1907.

Hotel Illinois, H. L. Allen, Proprietor.

Mr. F. G. Perkins.

DEAR SIR: I have your letter of 11 and see you Havent got the new spreader started i supose you Have by this time and I hope it will work satisfactory for we want one here as soon as possible

We put in a batch of the new formula and they are using it today it flows a little stringhey short like but i think we will get a good stick I am inclined to think we need a Pump Here to make sure of a flow under all circumstances

Hoping your Having good success with the machine I am yours as ever

Frank Baker.

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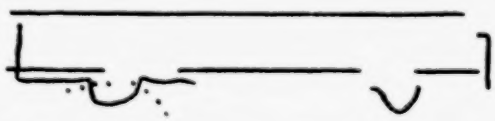
PLAINTIFFS' EXHIBIT BAKER LETTER 16

Mar. 31, 07.

The Oliver, South Bend, Ind., F. L. Guillaume, Manager.

DEAR FRANK: Reached here Fri. night, and saw that my letter to you from Richmond, arrived too late to reach you before you went away, and also a wire I sent to tell you when I should return.

The glue is working well on the big machine but the little one is "down" because of the breaking of a lug on R. H. side of lower glue box, through which the screw runs, which sets up the scraper.



Broken off where dotted.

This was done on acct. of undue strain probably upon monkey wrench on the wheel, the slide being strained forward more on one side than other & thus cramping it.

[fol. 898] It occurred Wed. and had not been fixed. I hope to get it fixed Monday.

The new machines are slowly advancing.

The "flow" here is very much better and no trouble at all in the piper or when starting up, and no scale on top.

This is prevented by starting early to cook, and at 1 p. m. putting cold water into the outside jacket of kettle and at 100°, stirring all afternoon so that when night comes the whole mass is cold throughout, instead of being warm in part.

I very much hope you found all well at home, and please give my best regards to Mrs. Baker.

Shall be glad to hear from you on matters in general. When will they start at P. B.

So you think that the young man who used to keep the piping etc. up on dryers would like to go to Fla.?

We could use a man there and he would have a good chance to work up.

The climate is much better than at P. B.

With regards

Yours sincerely, F. G. Perkins.

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Defendants' Exhibit Perkins Letter No. 5

Lake Mary, Fla., Jan. 27, 1905.

Mr. Nelson Windsor, Manager, Lowell M. Palmer, Poplar Bluff, Mo.

Dear Sir: Our car C. P. & St. L. 21546 was delivered to I. C. at Martin Jan. 19th and should now be at your mill; Martin being near Cairo. If so kindly wire me.

The materials I use for extra water-proofing and kerosene oil proofing, were sent separately and partly by express.

As a manufacturer myself, appreciating the value of uniformity, I can state to you that absolute and unvarying uniformity marks all our products. After I determine the degree of thickness, flow etc., which your veneer machines require, for as long as you use our glue, you will find no variation.

Yours very truly, F. G. Perkins, Pres't.

[fol. 899] DEFENDANTS' EXHIBIT PERKINS LETTER No. 1

Telegram

New York, 3-3, '05.

Nelson Windsor, Poplar Bluff, Mo.:

Have closed contract. Mr. Palmer has written authorizing necessary equipment.

F. G. Perkins.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 3

Lake Mary, Fla., March 11th, 1905.

Mr. Nelson Windsor, Supt., Lowell M. Palmer, Poplar Bluff, Mo.

DEAR SIR: Enclosed herewith please find sketch of stirrers for your mixing tanks, same being such as we use in our mill down here. Mr. Perkins requested that we send you this sketch.

You will see that the stirrer is halved in the middle for a distance of three feet, and in the center of this halved space, the hole is made to take the iron pipe or shaft; whichever you use. This hole must be made so as to make a snug fit around the pipe or shaft, and we use a brass key 5/8" square to help hold the stirrer in place on the shaft. If pipe is used, key-way can only be cut in same about 1/8" deep in the center, as otherwise the complete stock of the pipe will be cut through. A 1/8" key-way cut in the pipe would be sufficient to hold it in place along with the bolts which clamp the pipe very firmly, when drawn up. Of course if shafting is used, you can cut the key-way as deep as you wish.

We use 4 bolts on each side of the pipe and would advise you to use brass key, bolts and washers.

If your mixture is to be very hard to stir, and thick, would advise you to let the ends of your stirrer come within a few inches of the sides of your tank; if on the other hand, the mixture flows readily, the ends of the stirrers can be kept farther away, as the liquor will more easily be kept stirred in the corners.

[fol. 900] The center of our stirrers for a distance of about 4 feet, is left square, the remainder of each end is bevelled off at an angle of 45 degrees, and 2 inches of stock is left, per the sketch sent you. The sketch is made so as to run in the same direction as the hands of a watch, this will have a tendency to throw the liquor down towards the floor of the tank. If you wish you can reverse this, and run the stirrer the other way, or run it the other way as it is, but we prefer the way first noted.

We would advise you to use 6 x 8 oak with the hole for the pipe bored through the 6" way.

Yours very truly, Planters Mfg. Co., by J. B. B. Stryker, Local Mgr.

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DEFENDANTS' EXHIBIT PERKINS LETTER NO. 9

3/13/05.

DEAR MR. NEWTON: Yours of 7th just reed. If you have reed. no satisfactory bids, J. S. Bush & Co., Peoria, Ill., are very reliable and low priced. For your work I would not advise iron, especially in view of substances we will use for tight heads.

You mention "Parallel sides." Would suggest the usual taper, as parallel sides are very hard to keep tight.

It is very doubtful if for indoor work cypress is very much more useful than pine. I have known pine tanks to run over 20 years in perfect order yet. In Fla. cost is same but North it may be quite an item.

I think Busch would make pine tanks abt. $27 each.

I will leave Washington 18th for the Bluff, due there 21st. No Baker misunderstood me. You dump the glue right in, in your case. My remark only applied to the small exp. tank there. No; I don't think you absolutely need an agitator that will lift, but it usually costs as little as a non-lifting one, and is mighty handy. Moreover, if you make partial batches by adjusting agitator you do not whip air into the glue, and you will recall a case I showed you, where the bubble interfered with the "coating" effect.

I believe, were I you, I would put in the lifters and then we are ready for anything.

Paddle: After think this over, I believe we will do better to make this longer, missing sides by about 6" only, to avoid [fol. 901] uneven mixing, and partly mixed glue caking to sides.

Piping: We don't need the bottom line. Just a simple 1¼" pipe, swung from an elbow, so that if necessary you can just swing it up clear, i. e. if valve should leak.

We make our intermediate connection with a piece of stout 1" steam hose, long enough to clear the pipe away from tank.

The clearer the tank is, the easier to keep clean and simply hot water is enough just as you describe, once a week.

With kindest regards,

Sincerely yours, F. G. Perkins.

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DEFENDANTS' EXHIBIT PERKINS LETTER NO. 6

St. Louis, Mo., Mar. 19, 1905.

FRIEND NELSON: I will be down on Monday night. Just got word that the car of glue passed Atlanta 14th so it must be near you.

L. M. P. is very hopeful we can produce a waterproof head that he can use for flour barrels, big business he says; 17⅛" hd. I believe.

With your help it can be done.

With sincere regards,

G. F. Perkins.

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DEFENDANTS' EXHIBIT PERKINS LETTER NO. 8

Memphis, Tenn., Mar. 22, 1905.

FRIEND WINDSOR: I left last night so as to gain time, but as usual the I. M. can't go anywhere on time and we reached here 1 hour late, missing the Frisco connection to Birmingham which would have got me home tomorrow evening. I lose a whole day here.

Will you be so kind as to wire me when all is ready, or say 2 days before you are sure all will be ready.

While "you all" are more than competent to run perectly, even if I did not go on at all, yet it is my great desire hat not a pound be wasted, or an hour's time. I feel so ndebted to you for your help that on no account shall a [fol. 902] cloud, even of the most temporary description ross your sky, on my account.

This will be my last visit to my plant for months, probably and I will stay until you wire, and please do so to Sanford, Fla., a town 4 miles away, to which I have a telephone.

I enclose a list of the "Heavy body" and "Thin Body" in the car overdue.

If you could pile in 2 lots it would save rehandling. As ever,

Sincerely yours, F. G. Perkins.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 7

Cairo, Ill., May 8, 1905.

DEAR MR. WINDSOR: I find that I can't return today, so we will expect you and Mrs. Windsor at supper Wednesday night at the hotel.

We will arrive at P. B. tomorrow, Tuesday night, but I wanted to forewarn you.

Yours sincerely, F. G. Perkins.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 11

Cairo, Ill., May 8th, 1905.

Lowell M. Palmer, Esq., Poplar Bluff, Mo.

DEAR SIR: Referring to that part of enclosed bill for materials used for tight headings, I desire to say that while the amounts sent is in excess of our present case, it was not practicable to get out a smaller amount and the excess can be returned when desired and full credit will be given.

The only considerable item is for the #3 Glue which we had expected to also use on the regular glued heads but after I had sent it, a way was found to do away with its use on regular headings and thus make an economy, so I

have put it under the tight heading use, because we will largely use it there.

[fol. 903] As I am desirous that your work be done at the lowest cost I have secured a proposal from a manufacturer whereby you can buy the solvent direct @ 2¾c per pound F. O. B. St. Louis, providing you order at one time ten tons to be delivered as wanted. This would last you about three months.

As above stated you can take it in small lots of 5 to 10 barrels at a shipment.

Yours truly, Frank G. Perkins.

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DEFENDANTS' EXHIBIT PERKINS LETTER NO. 10

New York, June 13, 1905.

Lowell M. Palmer, Esq., Poplar Bluff, Mo.

DEAR SIR: I enclose credit memo. for Glue lately borrowed for use at Singer Mfg. Co., and thank you for courtesy.

As a partial offset I suggest that 1 ba*f* and 2 bbl. of glue, which I shipped to Poplar Bluff Feb. 1, from Chicago and which has not heretofore been billed, be allowed to stand, as I paid the freight on same, and enclose invoice. We used the bag and a part of the 2 bbls., balance being in your storehouse, and I propose using them on tight heads on my near return.

Please charge me with the cartage to depot on this and preceding lot sent Singer Co.

Yours truly, F. G. Perkins, Agt.

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DEFENDANTS' EXHIBIT PERKINS LETTER NO. 12

Chicago, August 5th, 1905.

Mr. Nelson Windsor, Supt., Lowell M. Palmer, Poplar Bluff, Mo.

DEAR SIR: I received your telegram last night. I presume the two car loads consist of one car which I sent from

'lorida July 7th, and which is all thin body goods, and a ar which I sent July 18th, from New York, consisting of oth kinds of goods.

fol. 904] Mr. Palmer permitted me to send him the three ar loads consisting of the above two and one which I pre- sume has just left New York and which is all heavy body.

The invoice and B/L for the July 7th, car was delivered to Mr. Palmer's New York office, by me, on July 14th, and the documents covering the second car was sent him a few days ago and I trust will have reached you by this time. It consisted of 77 bbls., thin body, 57 bags 240 lbs. each of thin body, 20 bags 100 lbs. each of thin body and 146 bags of powdered heavy body.

The third car on its way to you contains 305 bags all powdered heavy body.

I trust there will be no delay ensue on account of your not receiving the necessary documents from New York, for Mr. Palmer gave me the above co-operation in order to assist some urgent financial needs and I was becoming somewhat anxious at not hearing from the first two cars.

Yours very truly, F. G. Perkins.

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Defendants' Exhibit Perkins Letter No. 15

Chicago, August 22nd, 1905.

Nelson Windsor, Esq., Lowell M. Palmer, Poplar Bluff, Mo.

My Dear Sir: I have yours of the 15th, about the empty glue sacks. I will advise you very shortly about this. To my surprise I found the rate back to the factory on these was almost confiscatory and it may be necessary for us to resell them at a loss in St. Louis or Chicago. I will know by Thursday and will promptly write.

A remittance has arrived from you for which I thank you. We still owe you for the glue which you obligingly shipped to Cairo. I thought as you were not pretty well stocked up, that I would hold this until you started up again in the fall, at which time we expect to be prepared to send one kind instead of two. We will soon have a place here to

complete the tight barrel work and should you go away I presume the heads can be sent up.

Yours very truly, F. H. Perkins.

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[fol. 905] DEFENDANTS' EXHIBIT PERKINS LETTER No. 2

South Bend, Indiana, May 28th, '07.

Mr. Charles Langlotz, Mgr., R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: I find that your letter of May 20th, was not fully answered, under the impression that my letter to you of the same date, covered the points.

I have received an order from Mr. R. M. Parker, for a car load of the light body glue and the same had been ordered to you, with every possible urging and will be vigorously traced after it starts, and I presume it has already started.

My arrangement with Mr. Parker, was that I should receive the money upon receipt of the checked bill from Poplar Bluff, by his office, and I have no doubt that as before, your office will accommodate me by promptly checking the bill as soon as the goods reach you.

I ordered to you the 25 bags, at the time the exchange occurred and in the further desire to prevent your being short, I wrote Mr. Whitney, asking him to send you over 3,000 lbs. of light body and should there be any delay, I have no doubt that he will send more to you, in exchange for your courtesy in accommodating him. Should it be necessary to do this, I will of course reimburse him and will send you the bill.

Will you please advise me how much heavy body you have on hand, so that I may arrange my own output accordingly, and be sure to have some on hand for your future supply.

Yours very truly, F. G. Perkins.

FGP—S.

DEFENDANTS' EXHIBIT PERKINS LETTER OF MAY 30, 1907

May 30th, '07.

DEAR FRANK: I leave next Saturday for my business trip and you can address me % Gen. Del. Norfolk, Va., for two weeks and I will advise you my movements when I leave that section.

[fol. 906] I want to mention to you that we find it is very undesirable to use over ½ per cent of soda in our present formulas, for we find that by using more than this, the set is made slow and the stick is not so good, when over 24 h. I have Cairo on the ½ per cent basis and I think that when you go there, you will see that the glue is much stronger on that account and it does not turn black with age. Guy has lately written to me that he carried one batch from Thursday, to the next Wednesday, without its changing on him as it used to do.

Every thing is moving here very nicely and by the time I get back, I hope they will be ready to go on to the glue in room 43.

With best regards,

Sincerely yours, F. G. Perkins.

FGP—S.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 13

South Bend, Indiana, July 22, '07.

Mr. Chas. Langlotz, Mgr., R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: When I was at your plant you very courteously signified your willingness to reciprocate for the services which I expect to be able to render, by giving such recommendations as would prove of real value in furthering my business.

I am glad to state that an opportunity will soon be offered and I should like to suggest to you the points which will be of most benefit. The Singer Manufacturing Company, having successfully employed my glue in a large portion of its work, is considering its use for all of its work

at its many plants and one of the Eastern officials who has not personally seen the glue work, has suggested that your plant be written to, since you have had an opportunity to judge of the results for several years.

I feel that I can justly expect a good report and in case you are written to on the subject by the Singer Company, shall feel under much obligation to you if you will state to them, about as follows: "that since your beginning the use of the glue in January, 1905, a good many million heads have been glued up and that so far as you know not a single [fol. 907] complaint has ever been made, in spite of the fact that the service is very exacting, the work being very largely out doors and some times in damp canal boats, and that in times past, complaints were often made. That you found it superior for your purpose over any other glue which you tried, and that the manufacture-, Mr. F. H. Perkins, has served you promptly and efficiently, and that you place confidence in him, and that a considerable saving is made by its use."

I would suggest to you that it would be better not to mention Casein, or any other competing glue, in specific terms, for the letter will be most useful if the points are brought out which I have sketched in and the effect on their minds produced by a few broad strokes, in your own forcible way.

Thanking you in advance for this service and assuring you that I shall find it a great pleasure in the future to reciprocate this courtesy, I beg to remain, with kind personal regards,

Yours very truly, F. G. Perkins.

FGP—S.

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DEFENDANTS' EXHIBIT PERKINS LETTER NO 14

South Bend, Indiana, July 22, '07.

Mr. Chas. Langlotz, Mgr., R. M. Parker, Agt., Poplar Bluff, Mo.

DEAR SIR: As a result of my inspection at Poplar Bluff, I would recommend for the present, that a formula of mixing the glue be used as follows:

For each 1,000 lbs. of glue, first draw 13 in. of water in the tank and turn on the steam, heating it to between 100 deg. and 110 deg. Into this warm water the glue should be stirred and there should be if possible one hour of thorough mixing before adding solvent. The solvent should be used to the amount of 60 lbs. of solvent to 100 lbs of dry glue. The solvent should be dissolved in three times its own weight of water and after being thoroughly dissolved, should be slowly added to the mixture of glue and water in the tank below. The glue should be thoroughly and steadily agitated while the solvent is being added. The [fol. 908] slower the solvent can be added the better and not less than two hours should be used in adding it.

Under some conditions of the weather, it is possible to use about 55 lbs. of solvent, to the above formula, instead of 60 lbs. and a little practice will show this. When done, the mixture will be of a yellowish brown color and after standing awhile, it will become darker. The best results will always be had by mixing up only enough for one day's use at a time. After the glue is one day old, it does not set so quickly nor produce so strong a joint, as when used immediately after mixing.

I am at work getting estimates and having a blue print made for your other work and you will shortly hear from me on those points. Awaiting your further commands,

Yours very truly, F. G. Perkins.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 21

South Bend, Indiana, July 27, 1907.

Mr. Chas. Langlotz, Mgr., R. M. Parker, Agt., Poplar Bluff, Mo.

DEAR SIR: I have your valued letter of the 24th, and beg to say that you are quite correct in believing that it is 60 lbs. of solvent, to 1,000 lbs. of dry glue. My own was a typographical error.

With regard to the price on this solvent, I do not think you can get it any where now, for less than 3¼ cts. I am paying that in New York city and reselling to other customers. I regard this price as too high and am engaged in

direct negotiations, which may result in a lower price. We can buy it at a lower price, provided we take it in an iron drum, in one solid cake, but it is an awful nuisance to chop this up, for the stuff gets in the hair and on the face and you can imagine the uproar.

As soon as I get any better prices, I will promptly advise you.

Thanking you very much for the assistance contained in your last sentence. Awaiting your further favors, and trusting that you will allow me to reciprocate.

Yours very truly, F. G. Perkins.

F. C. P.—S.

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[fol. 909] DEFENDANTS' EXHIBIT PERKINS LETTER No. 4

South Bend, Indiana, August 10th, '07.

Mr. Chas. Langlotz, Manager, Mr. R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: Relative to the information requested by you, I beg to say, that since the original installation of the Glue machinery at Poplar Bluff, certain improvements have been made in the machinery itself, and also in the formula used on my Glue.

Taking up the machinery feature, I will recall to you that in all kinds of glue, under the old methods, considerable waste of glue is found at the edges of the glued up stock, and this waste hardened makes the layers of wood adhere together on the edges, so that considerable force is necessary to separate them.

On this account, not only is there a waste of glue, but the waste of glue involves some damage to the glued up stock, resulting in culls and also requires the labor, as in your case, of an extra man to open up the stock.

Impressed with this point, I was able to invent a gluing-up machine which has done away with these troubles. Instead of the glue applying rollers, rolling upon each other, by my arrangement, they are separately hung and can be adjusted at any distance, and yet have a continuous supply of glue, while this same supply of glue is now capable of close regulation.

It is not my desire to make any profit out of these methods, from my customers, and if you elect to obtain the above advantages, I will remodel your machines, without profit to myself, charging you the exact cost thereon, which I estimate to be about $250 each, on your two machines, exclusive of freight, and I think it is safe to say that you will save this cost inside of a year.

Another point where an improvement can be effected, is by using larger pipes from your tanks to your glue machines, and connecting up therewith a full opening pump, so as to propel the glue from the mixing tank to the machines.

This will allow you to use a heavier glue solution, which increases the strength of the joint and allows a larger spread of the glue, by which I mean that the full strength of the glue being available, it permits closer regulation on [fol. 910] the machine, so that a pound will be used to its full value.

Furthermore, by reducing the amount of water, a quicker set is obtained and there is less swelling of the wood, which as you know, now is a source of breaking to your retainer bolts. It always seems to me wise to do what ever will reduce the repair bill.

As previously stated, the above points are a result of the march of improvement and would be advisable, no matter whether you were using my glue or hide glue.

Coming now to the point of the formula used, I will recall to you that you are now using at Poplar Bluff the same methods of dissolving and cutting the glue, as were used by all of my customers, until within about one year, at which time I discovered another method of doing it, wherein we are able to reduce the amount of solvent, from 6% of the weight of the dry glue, down to one half of one per cent. In addition to this saving in the cost of the solvent, it does away with the necessity of rubber gloves on the hands of the men who are working in the glue, hitherto necessary because the 6% of solvent smarts the hands.

This method of cutting the glue, by ½ of 1%, of solvent, requires the use of double jacket, iron or steel tanks, instead of the wooden tanks which you now employ. The glue is heavier than the glue made under the old formula, hence it also requires the larger pipes and the glue pump above mentioned.

The advantage of the new formula being stated, I wish now to state its disadvantages, of which I was not aware when I discussed the point with you on my late visit to P. B.

I was under the impression that we were covering up here, with the new formula, about the same amount you are covering at P. B. with the old formula, but now having access to the full reports covering one year's use, I see that such is not the case and that we are not covering by about 10% with the new formula as much as you do at P. B. on the old formula.

I believe, however, that this is due to the fact that we did not get the machines fully adjusted until very lately and the records now appear to bear me out in the statement that we can cover as much with one formula as the other. It does, however, require a little closer regulation to accomplish this because in the old formula the glue gains bulk and hence is able to spread over more territory, than under the new formula, which does not gain bulk, unless this fact is understood and provided against by the aforesaid closer regulation.

[fol. 911] I am not able at this moment to give you an estimate on the cost of the new tanks, should you decide to use them, but I shall be very glad to send you the set of blue prints of the arrangements put in by the Singer Company, so that your whole output could be modelled like their successful one.

With regard to putting in the new Glue lines from the glue tanks to the machines and the pump, I should estimate that this would cost about $200.00.

If I have not covered all the points, I shall be very glad to furnish you any further information. If you should deem my opinion of any service, I should say that if the plant were mine, I should fix over the glue machines, enlarge the glue lines and put in the pump, for it is very clear to me that this entire expense will be saved within twelve months, and meantime, add a great deal to the efficiency of your plant, but I should not change the formula until I can positively assure you, from actual results, that you would gain money by the change. While it would be pleasant to cut down the solvent and save the gloves, yet there is no trouble with the labor on account of their hands, when given the gloves and I should not want you to go into any

expense on the tanks and then find that your work cost you more money than it did before.

Respectfully yours, Frank G. Perkins.

FGP—S.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 16

South Bend, Indiana, Sept. 12th, 07.

Mr. Chas. Langlotz, Mgr., R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: I am in receipt of your favor of Sept. 9th.

Veneer lathes: As I recall it, you mentioned to me that you were authorized by Mr. Parker, to sell these two lathes, with all missing parts replaced, for 50% of the cost price, to the Company, and as I remember it, further, you mentioned that the price new was $1200 each and at half price, this would make the cost of the two at $1200 now.

I wrote that I thought that I could get $1000 for the two, you will remember, so that really there is not a very large [fol. 912] margin between us, if the recollection above stated is correct. Will you do me the favor to advise me if those figures are correct.

Heavy and Light Body Glues: The letter which you mention as being shown to you by Mr. Parker, was in reply to one from him, which implied that in future, they should order only one grade. I replied to him saying that of course I should furnish any thing which was ordered, but that Baker had found he could get a larger covering by making different proportions in winter, from the summer. Now you are perfectly correct in recalling that I told you that I could and would make you one grade. If you advise me that a grade corresponding to 50% heavy and 50% light, suits you, I will make you a grade that will exactly reproduce this. My only point was that I believed you could save a little money by making the blend yourselves, because I thought you would prefer a somewhat different blend in the summer, from the winter. I could furnish you a car which would contain one half of each kind, in case that would seem desirable. In fact, my sole and only wish, is to furnish you whatever will be to the best economy and interests of your factory.

Present order: I carefully note what you write about supply on hand and will certainly get you a supply in season. If necessary, I shall ship you a small car on the order, from South Bend stock.

I will certainly go over and see you when I go to Cairo next. I have not been there since the time I last called at Poplar Bluff.

With very kindest regards,

Yours very truly, F. G. Perkins.

FGP—S.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 18

South Bend, Ind., September 25th, '07.

Mr. Chas. Langlotz, Mgr., R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: I have your valued letter of Sept. 17th.

In regard to the question of sending in future, the right kind of glue, I will certainly take upon myself to see that you have just the right article, so far as strength goes and if Baker thinks that a glue duplicating the present blend [fol. 913] is the best, I will furnish the same in future, since it seems to be in your opinion, more convenient to have it that way.

I was under the impression that Baker varied it from time to time, more than it now appears was the case.

I quite agree with you that the responsibility really is on me and only desired that you should have the very best article.

The glue sent you on your last order, is all light body, and no doubt when it arrives you will be in a position to determine the proportion in the next car, in order to clean up the light body, and after the balance is struck will ship the balance of the next car, properly marked and of such nature that it shall be used alone. The delays of transportation are so great, and also the factory is so very busy, that I trust that we will receive your valued order for this, at your earliest convenience, in order to avoid any anxiety. It would seem to me that it is not safe for you to work with

less stock on hand than one car of glue, as we have had instances of our cars being three months on the road.

With kindest personal regards,

Yours very truly, F. G. Perkins.

FGP—S—G.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 23

Water-proof Glue. Heat-proof Glue

Frank G. Perkins, Manufacturer Special Veneer and Furniture Glues, 211 N. Lafayette Street, South Bend, Indiana

From Lake Mary, Florida, November 5th, '07.

Mr. Chas. Langlotz, Mgr., R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: This is just to advise you that I have not yet received any order from Mr. Parker for another car load of glue, which you requested him to order.

[fol. 914] I presume that within a few days, if not already, there will reach you the car of glue so long on the road, as I wrote you on Oct. 18th.

I have now worked out the right goods to send you in future, to avoid sending two kinds.

I remain, with kindest personal regards,

Yours very truly, F. G. Perkins.

FGP—S—G.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 17

From Greenville, N. C., November 22nd, 1907.

Mr. Chas. Langlotz, Mgr., Mr. R. M. Parker, Agt. Poplar Bluff, Mo.

DEAR SIR: I am in receipt of a letter from Mr. Parker telling me of some trouble that has been experienced with the heading, and requesting me to go as soon as possible to the Bluff and see what the matter is, and advise him. I will go to the Bluff just as soon as I finish some work here, but I feel quite sure that the causes for any trouble could

be at once removed, and that Frank Baker's judgment on the causes and cures ought to be much better than my own.

In all kinds of glueing a very great deal depends upon the judgment of the man in charge of the glueing. In the use of the Hide Glue for example as the seasons change, the mixture must be altered in its components.

The glue is exactly the same as it always has been, so that the causes of the trouble ought to be found outside of that.

I should suppose that the troubles are either that the formula may need some readjustment on account of the weather, or on account of other factors; or with the tank and machines not working right.

One thing I would suggest that fresh glue be used in as much as you are only using about one third of the quantity which those tanks were designed to handle. The glue is always stronger when just mixed than it is after standing some hours, and to give the very strongest results it is best to mix up the night before about enough glue to run the following forenoon, and then mix up during that forenoon the proper quantity for the afternoon work.

[fol. 915] This point, of course, takes care of itself at 2500 pounds per day used, but it should be taken into consideration when only from 800 to 1200 pounds are used per day in those large tanks. It can be said now for certain that the trouble is in some of those points of handling or in some defects of the appliances or equipment, and I should rejoice if the matter can be straightened out before I reach Poplar Bluff, as it has so much better effect.

Of course my very best services are at your disposal.

I remain,

Yours very truly, F. G. Perkins.

FGP/VMW.

DEFENDANTS' EXHIBIT PERKINS LETTER No. 24

Formula for Using Glue

Office of R. M. Parker, Agent

Poplar Bluff, Mo., 12-12, '07.

R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: I would suggest for your present conditions, the following formula: Use a mixture of 2 parts light and 1 part heavy.

For each pound of glue, use not to exceed 3½ parts of water by weight, and less than this amount would be better, provided you can flow the mixture through your present system of pipes. Would use 6½ to 7% of the weight of the glue, in dry solvent, mixing this solvent with three parts water, before adding to the mixture.

This would work out as follows:

For each 1000# of glue, first draw 13 inches of water in the tank, and warm it up to 100 Deg. Into this warm water stir the glue, and if possible give it one hour of mixing before adding the solvent. The solvent should be used in the proportion of from 60 to 70# of dry solvent per 100# of glue, dissolved as above, in three times its own weight of water and slowly added. The mixture of glue and water must be thoroughly and constantly agitated while adding the solvent, and the slower the solvent is added the better, and not less than two hours should be used in adding the solvent. The best results will always be had by mixing [fol. 916] up only enough glue at a time for one day's work.

As soon as your pipes and stirring equipment is made standard, the mixture above given should be changed, so as to leave out all the water possible, and the covering capacity can be brought up to its standard by changing the grooving of the rolls, and arranging the machines so as to prevent the present slop and waste. A very bad point about the present end slop and waste, is that it binds together the edges of the bale, so that the joints while green, are subjected to very violent abuse, in order to separate them. This should not be done, and I will undertake to prevent

the same by remodelling your machines. This would no doubt prevent a good many culls.

Yours respectfully, F. G. Perkins.

(Pencil notation at foot of letter):

262 lbs of water to 1'' in depth of tank
13

786
262

3406 lbs. water to 1000 lbs. glue or 3 4/10 to 1.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 22

South Bend, Indiana, December 17th, '07.

Mr. Chas. Langlotz, Mgr., R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: In order to keep matters straight between your New York office and myself, I will hold up the bill for the ten sacks, which I got from the Singer Co., until you can send a proforma order to New York for the same and have them send me an order. Thus everything will be straight all along the line.

It was quite interesting to me while at the Bluff, to observe that 7,500 sets of headings are now produced at a labor cost of very little more than the 5,000 sets, which you were turning out at my last visit and you appear to do this, by using one crew part of the time on a veneer lathe and part of the time gluing up, which makes a very economical arrangement.

I don't think I ever saw a labor expense of producing glued up stock so low as it is at the Bluff.

[fol. 917] With regard to the subject I mentioned over the telephone, namely, of damp stock coming through the Nichols driers, I don't think that I ever saw very good work done when the steam pressure drops under 85 lbs. This is particularly true on stock ⅛ and over. While it is true that the difference in heat units between 100 lbs. and say 80 lbs. is very slight, yet another facto- is present, which is

that to dry out the inner part of a 1/8 veneer, under the Nichols system, the inner moisture must be fairly exploded out and this means that the internal heat of the veneer, must be very rapidly absorbed from the external skin.

The power of conduction of heat is not directly as the difference of temperatures, but is nearer in proportion to the cube of the difference, hence there is a very rapid falling off in the conduction of the heat as the steam pressure lowers. I have taken part in very careful and long continued experiments on this point, with the above results, so that I am not handing out any theory to you, but just passing along those results which were obtained at considerable expense.

It was found for instance that with steam at 60 lbs., on 1/8 and 3/16 veneers, when the normal time of drying was about 15 minutes with 100 lbs. pressure, after the veneers were in the driers for one hour, at 60 lbs., the veneers were not nearly as dry as with 12 minutes at 100 lbs.

It is true that the outside surface of the wood was as dry, but the inner fibers of the wood were not equally dry and after a few hours the whole pieces of veneer reabsorbed the moisture from the damp centers and were unfit to glue up.

You have a steam recording guage, which of course is a great help, in keeping constant steam. It is of course a good deal easier for a fireman to make excuses than it is to make steam, at least I find it so in my own case, and I will again beg leave to say to you that this is based on no wish at all to "but in," but only as deeply interested and sympathetic with your own desire to have the plant make the best possible record.

With personal regards,

Yours sincerely, F. G. Perkins.

FGP—S—G.

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[fol. 918] DEFENDANTS' EXHIBIT PERKINS LETTER No. 20

South Bend, Indiana, February 12th, '08.

Mr. Chas. Langlotz, Mgr., R. M. Parker, Agent, Poplar Bluff, Mo.

DEAR SIR: I have your valued letter of the 10th., with enclosures, and all are carefully noted.

Glue Machine: This is in the shop and I find it is necessary to have some patterns made which is now being done. I will advise you in a few days as to the probable time it will take to get this through our hands. The work is a little more difficult to design than I had expected but will have a good job when done.

Soda: This solvent which you use is Sodium Hydroxide, frequently called "Caustic Soda." In order to get the right article, which is quite important, it is advisable I think to have the correct name in mind, as this affords a key to the later description, by figures. The caustic soda commonly sold as such, is a very impure mixture, and has not the desired amount of the hydroxide element. For this, is found substituted the carbonate form of soda, which is of no use whatever to us. This being so, the best manufacturers prefer to sell their article on a guaranteed base of strength and purity and the very lowest grade is supposed to contain a 60 deg. strength, as measured by the hydroxide element. This accounts for your quotation based on that amount. The 74 deg. and 76 deg. cost proportionately more, and we have found that not less than 76 deg. should be employed. I observe that some of the people call this "per cent," but the manufacturers reserve that term as expressing the purity of the constituents in freedom from all matters except "soda." For illustration, an article of 76 deg. 98% pure, is understood by the manufacturers, to mean 76 deg. hydroxide, and the whole article to be 98% of a total purity, leaving 2% for all substances except the various forms of soda.

There is as you may suppose quite a hazy idea in the minds of salesmen regarding this point, but I believe they at bottom are talking about the same article. A 76 deg. article the makers tell me, is necessarily at least 98% pure.

Powdering: I observe one very important omission in all the prices you have received, except possibly in the one from Meyer Bros. For your use, the article must be pow- [ofl. 919] dered and the Whitelaw quotation in drums, is certainly in the solid form, and it would take you at least one man's time constantly, to dig it out. We tried this at the Bluff when we started, I think, and have known of several other users trying to use it in the solid form, and it is an unendurable nuisance, and the waste is very great.

Hence, would suggest you specify it as "powdered." Some of my customers I think buy of the Champion Chemical Co., Chicago, and I will find out where some others buy and advise you as soon as found out.

Glue: I will beg leave to suggest that you arrange to keep at least 40 days' supply of Glue between your ordering, and arrival. This is needed to provide against car service delay and also the possibility that the factory might not be able to ship a car on receipt of notice. We take great care in getting out the goods for your factory, and would not want to ship anything of which there was the slightest doubt. The Singer Company keep 60 days, reserve and once or twice we have been quite close to pinched at that.

Yours very truly, F. G. Perkins.

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DEFENDANTS' EXHIBIT PERKINS LETTER No. 19

South Bend, Indiana, May 27, '08.

Mr. Wm. N. Barron, Manager, Poplar Bluff, Mo.

DEAR SIR: The last visit I made to Poplar Bluff, I saw in your warehouse a considerable quantity of casein and as casein now is in rather scarce supply, it occurred to me that it would be a good time for you to dispose of this, if you wish to do so.

The use of casein is now almost altogether confined to various branches of the paper trade, and I have quite an acquaintance among them, and think I could sell this parcel, either on commission, or else if you wish to make a price, I can possibly get my commission above the price.

I think you have there only about 4 tons, but still it represents money and of course if I can get a little something out of it, shall be glad to do so.

Yours truly, F. G. Perkins.

P. S.—We are at last just winding up your machine and it will be painted next Saturday, and to you next week.

[fol. 920] DEFENDANTS' EXHIBIT PERKINS INVOICE No. 1

Mr. Lowell M. Palmer, Poplar Bluff, Mo., Bought of F. G. Perkins, Agent for Planters' Manufacturing Company, 192 Fulton Street, New York

April 29th, 1905.

Terms —.

| | | | |
|---|---|---|---|
| 4 barrels solvent, | 2,728<br>260—2,468 | 3¾ | $92.55 |

Mail check Lake Mary, Fla.

DEFENDANTS' EXHIBIT PERKINS INVOICE No. 2

Lowell M. Palmer, Esq., Poplar Bluff, Mo., Bought of F. G. Perkins, Agent for Planters' Manufacturing Company, 192 Fulton Street, New York

May 14, 1905.

Terms —.

| | | | |
|---|---|---|---|
| 5 bbls. Solvent<br>655-62<br>690-71<br>653-67<br>626-63<br>694-75 | 2,980# | 3¾c | $111.75 |

3,318-338-2,980 net.

Copy

[fol. 921] DEFENDANTS' EXHIBIT PERKINS INVOICE No. 3

Lowell M. Palmer, Esq., Poplar Bluff, Mo., Bought of F. G. Perkins, Agent for Planters' Manufacturing Company, 192 Fulton Street, New York

May 25, 1905.

Terms —.

| | | | | |
|---|---|---|---|---|
| April 26 | 3 pr. Pearl Rubber Gloves #9 | .50 | $1.50 | |
| " 27 | 9 pr. " " " | .50 | 4.50 | |
| | (12 delv'd—3 ret'd.) | | | |
| " " | 6 pr. cloth lined $11.00 Doz. | | 5.50 | |
| " 29 | 3 pr. " " " | | 2.75 | |
| | 1 Baume Hydrometer | | .50 | |
| | 1 Therm. in wood case | | .50 | |
| May 17 | 3 pr. cloth lined #13 gloves | 1.50 | 4.50 | $19.75 |

Copy

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DEFENDANTS' EXHIBIT PERKINS INVOICE No. 4

Lowell M. Palmer, Esq., Poplar Bluff, Mo., Bought of F. G. Perkins, Agent for Planters' Manufacturing Company, 192 Fulton Street, New York

May 27, 05

Terms —.

| | | | |
|---|---|---|---|
| 2 pr. horsehide gloves | .90 | $1.80 | |
| Postage | | .15 | $1.95 |

Copy

[fol. 922] DEFENDANTS' EXHIBIT PERKINS INVOICE No. 5

Lowell M. Palmer, Esq., Poplar Bluff, Mo., Bought of F. G. Perkins, Agent for Planters' Manufacturing Company, 192 Fulton Street, New York

June 13, '05.

Terms —.

| | | | | | |
|---|---|---|---|---|---|
| Feb. 1/05. | 1 bag glue #42 | 280# | | | |
| | 2 bbls 188#, 290# | | | | |
| | net | 378 | 658#@ 7.2c | $47.37 | |

Shipped from Chicago stock and frt. paid by F. G. Perkins.
O. K. N. W.

Copy

---

DEFENDANTS' EXHIBIT PERKINS INVOICE VOUCHER

Poplar Bluff, Mo., August 19, 1905.

Lowell M. Palmer to F. G. Perkins, Agt., Dr.

Address New York

For invoice five attached hereto

| | | | |
|---|---|---|---|
| April | 29th | $92.55 | |
| May | 14 | 111.75 | |
| | 25 | 19.75 | |
| | 27 | 1.95 | |
| June | 13 | 47.37 | $273.37 |

Approved for $273.37
(Signed) Nelson Windsor, Superintendent.
Examined by me and found correct.
(Signed) G.

Poplar Bluff, Mo., —— —, 190-.

Received of Lowell M. Palmer, two hundred and seventy-three and 37/100 dollars, in full for above account.
Please sign and return this voucher to Lowell M. Palmer, Polpar Bluff, Mo.

(Signed) Frank G. Perkins, Agent.

Copy

[fol. 923] DEFENDANTS' EXHIBIT TANK INVOICE

Poplar Bluff, Mo., 4-1-1905.

Mr. L. M. Palmer, City, in Account with Walker-Garetson Mfg. Co., Manufacturers and Dealers in Sash, Doors and Lumber

All Kinds of Mill Work in Hard and Soft Wood to Order

Manufacturers of Store and Office Furniture, Scroll and Turned Work

| | | | |
|---|---|---|---|
| Jany. | 26 | To 1 pc. lbr | .20 |
| Mch. | 1 | " turning cant hook hdls. (69) | 11 50 |
| | 17 | " 2 sash $2.40 (24) 50# tar $1.50 | 3 90 |
| | 28 | " 4 pcs. 2 x 6 x 12 .96, 2 x 6 x 16 $1.30 | 2 26 |
| | 31 | " 2 tanks 7 x 8' | 110 00 |
| | | | $127 86 |
| Apr. | 4 | By cash | 2 40 |
| | | | $125 46 |

Paid Apr. 15, 1905. Walker-Garetson Mfg. Co. Thanks. Copy.

---

DEFENDANTS' EXHIBIT WALKER EXHIBIT

Extracts from the Books of the Walker-Garetson Mfg. Co.

Journal Entry on Page 6 of the Journal for 1905

March 31, 1905

L. M. Palmer

527

To 2 tanks 8 x 7 ..... 110 00

L. M. Palmer Company

'05

| | | | | | |
|---|---|---|---|---|---|
| Mch. | | | | | |
| " | 31 | To 2 tanks 8 x 7' | 6 | | 110 00 |
| Apr. | 1 | " Sawing Adjutators | 8 | | 4 00 |

[fol. 924] DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 1

June 3, 1905.

Mr. Lowell M. Palmer, Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr.

Terms: Net 10 days.

| | | |
|---|---|---|
| 5 bbls. 3020 lbs. "76-98" soda @ $2.75 cwt | | $83 05 |
| | May 23 paid on a/c | 81 95 |
| 611–45 | | |
| 674–59 | Due us | $1 10 |
| 638–58 | F. O. B. St. Louis, | |
| 704–59 | Via I. M. | |
| 674–60 | | |
| 3301–281 | O. K. | |

Copy.

---

DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 1A

Poplar Bluff, Mo., June 13, 1905.

Lowell M. Palmer to Wm. Schield Mfg. Co., Dr.

Address St. Louis, Mo. 6

For invoice one attached hereto.

Solvent ..... $1 10

Approved for $1.10

Examined by me and found correct.
Superintendent. (Signed) G.

Poplar Bluff, Mo., Jun. 14, 1905.

Received of Lowell M. Palmer one and 10/100 dollars in full for above account.

Please sign and return this voucher to Lowell M. Palmer, Poplar Bluff, Mo.

(Signed) Wm. Schield Mfg. Co., Pr. Weber.

Copy.

[fol. 925] DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 2

May 30th, 1907.

Mr. R. M. Parker, Agent, Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr.

Terms: Net 10 days.

2 bbls 1168# "76-98" Soda, at 300 per 100 lbs..... $35 04

635–46
630–51

1265–97 – 1168

Via I. M.

Received O. K. Prices O. K. Extensions O. K. G. H. W.

Copy.

---

DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 2A

R. M. Parker, Agent, Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr.

As per one invoices attached. June 11, 1907.

May 30 Solvent..... $35 04

Correct.

Geo. H. Windsor, Cashier.

Approved for Payment.
M. E. Horlacher, Superintendent.

Check No. 5916. June 12, 1907.

$35 04

Received from R. M. Parker, Agent, thirty-five and 04/100 dollars in full for above account.
(Signed) Wm. Schield Mfg. Co., Wm. Schield, Prop.

Copy.

[fol. 926] DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 3

June 22nd, 1907.

Mr. R. M. Parker, Agt., Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr.

Terms: Net 10 days.

4 bbls. "76-98" Soda, 2373 at $3.00 per 100 .. $71 19
F. O. B. St. Louis.

672–55
650–57
590–41
670–56

2582–209 – 2373 Duplicate

Received O. K. Prices O. K. Extensions O. K. G. H. W.
Copy.

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DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 3A

Mr. R. M. Parker, Agent, Poplar Bluff, Mo., to Wm. Schield & Co., St. Louis, Mo., Dr.

As per one invoices attached. July 3, 1907.

June 22 4 bbls. Soda ..... $71.19
Correct:

Geo. H. Windsor, Cashier

Approved for Payment:
———— Superintendent.

Check No. 5960 Jul. 5, 1907.

$71 19

Received from R. M. Parker, Agent, seventy-one and 19/100 dollars in full for above account.
(Signed) Wm. Schield Mfg. Co.

[fol. 927] DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 4

St. Louis, Mo., July 24th, 1907.

Mr. R. M. Parker, Agent, Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr.

Terms: Net 10 days.

6 bbls. "76-98" Soda, 3343# at $3.25 per 100# $108 65

595–55–540
586–55–531
644–53–591 Via Iron M.
615–56–559
605–52–553
620–51–569

3665–322–3343#

Received O. K. Prices O. K. Extensions O. K. G. H. W.

Copy.

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DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 4A

R. M. Parker, Agent, Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr.

As per one invoices attached 7-30-1907.

7—24 6 bbls. soda ..... $108 65

Correct:

Geo. H. Windsor, Cashier.

Approved for Payment:
M. E. Horlacher, Superintendent.

Check No. 6025. Jul. 31, 1907... $108 65

Received from R. M. Parker, Agent, one hundred and eight and 65 /100 dollars in full for above account.
(Signed) Wm. Schield Mfg. Co., Wm. Schield.

[fol. 928] DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 5

St. Louis, Mo., July 31st, 1907.

Mr. R. M. Parker, Agent, Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr.

Terms: Net 10 days.

20 bbls. "76-98" Soda, 11352# at $3.20 per 100# $363 26
Via Iron Mt. Ry. F. O. B. St. Louis.

| | | | |
|---|---|---|---|
| 610–54–556 | 643–45–598 | 618–61–557 | 611–51–560 |
| 581–54–527 | 603–52–551 | 650–52–598 | 653–55–598 |
| 593–53–540 | 638–53–585 | 613–57–556 | 636–54–582 |
| 604–52–552 | 614–56–558 | 633–52–581 | 624–57–567 |
| 595–52–543 | 630–60–570 | 655–52–603 | 631–61–570 |

Received O. K. Prices O. K. Extensions O. K. G. H. W.

Copy.

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DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 5A

R. M. Parker, Agent, Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr

As per one invoices attached. 8-14-1907.

7 31 20 bbls. solvent ..... $363 26

Correct:

Geo. H. Windsor, Cashier.

Approved for payment:
M. E. Horlacher, Superintendent.

Check No. 6062 August 16, 1907 ..... $363 26

Received from R. M. Parker, Agent, three hundred and sixty-three and 26/100 dollars in full for above account.
(Signed) Wm. Schield Mfg. Co., Wm. Schield.

[fol. 929] DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 6

St. Louis, Mo., Jan. 6th, 1908.

Mr. R. M. Parker, Agt., Poplar Bluff, Mo., to William Schield Mfg. Co., St. Louis, Mo., Dr.

Terms: Net 10 days.

20 bbls. "76-98" Soda, 11845# at $3.20 F. O. B. St. Louis, $379.04

| | | |
|---|---|---|
| 664-56-608 | 619-51-568 | 621-50-571 |
| 662-52-610 | 638-52-586 | 648-54-594 |
| 630-54-576 | 676-54-622 | 650-50-600 |
| 643-57-586 | 638-53-585 | 642-55-587 |
| 653-52-601 | 683-56-627 | |
| 680-59-621 | 630-59-571 | |
| 632-49-583 | 636-54-582 | |
| 603-46-557 | 663-53-610 | |

Received O. K. Prices O. K. Extensions O. K.
12911-1066-11845# Via Iron M. Ry.
Frt. $39.99.
Copy.

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DEFENDANTS' EXHIBIT SCHIELD INVOICE No. 6A

R. M. Parker, Agent, Poplar Bluff, Mo., to Wm. Schield Mfg. Co., St. Louis, Mo., Dr.

As per one invoices attached. 1-17-1908.

Jan. 6 20 bbls. "76-98" soda $379.04

Correct:
Geo. H. Windsor, Cashier
Approved for payment:
M. E. Horlacher, Superintendent.

Check No.——— Jan. 18, 1908. $379.04

Received from R. M. Parker, Agent, three hundred seventy-nine and 04/100 dollars in full for above account.
(signed) Wm. Schield Mfg. Co.
Wm. Schield.

Copy.

[fol. 930] DEFENDANTS' EXHIBIT DAY RUBBER CO. INVOICE

Claims for shortage must be made within five days from receipt of goods.

All accounts subject to draft with exchange without notice at maturity.

Day Rubber Co.,

415-417 North Fourth Street,
Rubber Goods of every description.

Our order No. 01878
Your order No. 5079.

St. Louis, Mo., Apr. 21, 1906.

Sold to Lowell M. Palmer, Poplar Bluff, Mo.
Terms: 2% 10 days; net 60 days Ship to - - via. Ex.

| | | | | |
|---|---|---|---|---|
| 11/12 doz. mens ½ L. gloves | | $18.00 | $16.50 | |
| 1/12 " " " " " | #13 | 21.00 | 1.75 | |
| | 33⅓% | | $18.25 | $12.17 |
| | | | | .24 |
| | | | | $11.93 |

Received O. K. 2%..
Prices O. K.
D. Extensions O. K. ..
We will not be responsible for money collected by or loaned to agents.

Poplar Bluff, Mo., April 27, 1906.

Lowell M. Palmer,

To Day Rubber Co., Dr.

Address St. Louis, Mo.

For invoice one attached hereto:

April 21st. $11.93

Approved for $11.93
Nelson Windsor,
Superintendent.

Examined by me and found correct:
G.

St. Louis, April 30, 1906.

Received of Lowell M. Palmer eleven and 93/100 dollars in full for above account.
Please sign and return this
voucher to Lowell M. Palmer, Poplar Bluff, Mo. (signed) Day Rubber Co.
J. G. Conlon.

[fol. 931] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE, INVOICE AND PAPERS, No. 1"

Mr. Lowell M. Palmer, 184 Front St., N. Y. Bought of F. G. Perkins, Agent for Planters' Manufacturing Company, Lake Mary, Fla. [192 Fulton Street]*

January 13th, 1905.

| | | |
|---|---|---|
| 54 bags Perkins's Veneer Glue 15,120 .7 | 1,058 40 | |
| Less 20c. per 100 lbs. freight to N. Y. | 30 24 | |
| | | 1,028 16 |
| 54 bags at .15 (credit given when returned) | | 8 10 |
| 642<br>3 bbls. No. 3 glue 621 = 2,039 net at .3<br>776 | | 61 17 |
| | | 1,097 43 |

Car A. C. E. 21,180.
Paid Mar. 3, 1905. F. G. Perkins.
O. K. L. M. P.

[*Erased in copy.]

"DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE, INVOICE AND PAPERS, No. 1-A"

Elijah Windsor, Mill Superintendent. Charles Langlotz, Railroad Manager

Mill and Railroad Office of Lowell M. Palmer

Poplar Bluff, Mo., 2-14-, '05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I enclose herewith copy of expense for the 54 bags of starch about which I wrote you on the 4th instant, as per your request of the 10th.

Yours respectfully, Nelson Windsor.

Encl.
C.
F. G. Perkins.
Planters Mfg. Co.

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[fol. 932] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE, INVOICE AND PAPERS, No. 1-B"

Freight Bill. Ex Bill No. 2189

Poplar Bluff, Mo., Division 17, 1905

Consignee, Lowell M. Palmer.

To St. Louis, Iron Mountain and Southern Ry., Dr. Cairo, Ill.

| Date | Number | Car No. and Initial | | Consignor |
|---|---|---|---|---|
| 1/22 | 1187 | 21546 | C. P. & M. L. | J. C. |

| No. of Packages | Articles & Marks | Weight | Rate | Freight charges | Advance charges |
|---|---|---|---|---|---|
| 54 | Bags Starch | 15120 | 27 | 4682 | 11040 |

C. O. M.
Received payment—L. F. Villon W. Agent.
Total to collect, 15122.

"Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 2"

Mr. Lowell M. Palmer, 184 Front St., N. Y. Bought of F. G. Perkins, Agent for Planters' Manufacturing Company [192 Fulton Street, New York]*

Lake Mary, Fla., March 11th, 1905.

Terms.

| | | |
|---|---|---|
| 254 bags Perkins' Veneer Glue, 59,760 lbs. 7c. | 5,183 20 | |
| Less 20c. per 100 lbs. freight to N. Y. | 119 52 | |
| | | 4,063 68 |
| 254 bags at .15 | | 38 10 |
| | | 4,101 78 |

Car A. C. L. 15,493.
Duplicate B/L attached.
Items, O. K.
Prices O. K. G. F. Royce. Paid April 11, 1905.
Extension O. K. Planters Mfg. Co.,
Charge Poplar Bluff. By J. B. B. S.
Receipt & Return to 184 Front St., N. Y.

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[fol. 933] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 2-A"

New York, March 11, 1905.

Planters Mfg. Co., Sold to the Brooklyn Cooperage Co., Manufacturers of Flour, Sugar, Fruit, Oil & Syrup, Barrels, also Molasses, Rum, Wine & Alcohol Shooks, for Export, Office 184 Front St., Cor. Burling Slip

| | |
|---|---|
| #15493—254 bags Perkins Veneer Glue 59,760 lbs. at 7c | 4183.20 |
| A. C. L. less 20c per 100 lbs. freight to N. Y. | 119.52 |
| | 4063.68 |
| 254 bags at 15c | 38.10 |
| | $4101.78 |

[*Erased in copy.]

Items O. K.
Prices O. K. G. F. Royce
Extensions O. K.
Charge Poplar Bluff Paid April 7th, 1905.

---

"Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 2-B"

Elijah Windsor, Factory Superintendent. Charles Langlotz, Railroad Manager

Factory and Railroad Office of Lowell M. Palmer

Poplar Bluff, Mo., 3-30-05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

Dear Sir: Car A. C. L. 15493 containing Perkins' veneer glue has arrived and has been unloaded, and contents check according to the copy invoice made in your office March 11th. I return herewith the copy referred to.

Yours respectfully, Nelson Windsor.

Encl. C.

[fol. 934] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 2-C"

Freight Bill, Ex. Bill No. 1466.

Bu Station Division B123, 1905.

Consignee L. M. Palmer

To St. Louis, Iron Mountain & Southern Ry., dr., Cairo, Ill.

| Date | Number | Car No. and initial | Consignor | Original point of shipment. |
|---|---|---|---|---|
| 3/22 | 1447 | 15493 A. P. L. | J. C. | Lake Mary |

| No. of packages | Articles & Marks | weight | rate | charges | advance charges |
|---|---|---|---|---|---|
| 254 | Sx Flour | 59760 | 21 27 / 9 | 53.78 | 286.85 |

O. K.

Received payment L. F. Villon W Agent

Total to collect 340.63

"Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 3"

Elijah Windsor, Factory Superintendent. Charles Langlotz, Railroad Manager

Factory and Railroad Office of Lowell M. Palmer

Poplar Bluff, Mo., 4-21, '05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

Dear Sir: Enclosed please find invoice and receipted expense bill for car S. A. L. 15385, which was unloaded on the 20th instant, and which contained Perkins' new glue; the contents of this car checked correctly.

Yours respectfully, Nelson Windsor.

Beyham Pay attached bill LMP.
Paid Apr. 24, 1905.

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[fol. 935] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 3-a"

Mr. Lowell M. Palmer, 184 Front St., New York, Bought of F. G. Perkins, Agent for Planters' Manufacturing Company [192 Fulton Street, New York],* Lake Mary, Fla.

March 28th, 1905.

| | |
|---|---|
| 125 bags Perkins's Veneer Glue, 30,200 lbs. at 7.20 f. o. b. Cairo | 2,174.40 |
| 125 bags at 15c | 18.75 |
| | 2,193.15 |
| Car S A L 15,358 less f. o. b. to Cairo | 217.44 |
| | 1,975.71 |

Paid Apr. 26, 1905. Receipt and return to 184 Front St., N. Y.
Items O. K.

---

[*Erased in copy.]

Prices O. K.
Extension O. K. G. F. Royce
Charge Poplar Bluff
Received payment April 26, 1905. F. G. Perkins, Agent, by Catherwood.
With our thanks.

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[fol. 936] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS, No. 4"

Mr. Lowell M. Palmer, 184 Front Street, New York, Bought of F. G. Perkins, Agent for Planters' Manufacturing Company, 192 Fulton Street, New York, April 4th, 1905

Mail Check Lake Mary, Fla.

| | | |
|---|---|---|
| 140 bags Perkins Veneer Glue, 30,100 pounds f. o. b. Cairo 7.20 | 2,167.20 | |
| 140 bags at 15c | 21 00 | 2,188 20 |
| Less f. o. b. to Cairo, Ill. | | 138.46 |
| Paid May 1, 1905 | | 2,049.74 |

M.P. 22,736 shipped from Jacksonville, B/L Enc.
Receipt & Return to 184 Front St., N. Y.
May 1, 1905.
Items, O. K.
Prices, O. K.
Extensions O. K. G. F. Royce
Charge Poplar Bluff with our thanks.
Received payment May 5th, 1905. F. G. Perkins, Agent, by T. B. Cotherwood.

[fol. 937] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE, INVOICE AND PAPERS, No. 4-A"

Elijah Windsor, Factory Superintendent. Charles Langlotz, Railroad Manager

Factory and Railroad Office of Lowell M. Palmer, Poplar Bluff, Mo.

4-27, '05.

Lowell M. Palmer, Esq., 184 Front St., New York City.

DEAR SIR: I enclose herewith invoice and receipted expense bill for the Perkins glue stock contained in car No. P. 22736. The contents of the car checked alright with the invoice.

Yours respectfully, Nelson Windsor.

Encl. C.

This glue is still being billed or classified as starch.

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[fol. 938] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 5"

Lake Mary, Fla., June 16, 1905.

Mr. Lowell M. Palmer, 184 Front Street, New York, Bought of F. G. Perkins, Agent

| | | |
|---|---|---|
| 172 bags Perkins's Veneer Glue, Car C. C. C. & St. L. 12,207 | 39,840 lbs. | |
| 108 bags Perkins's Veneer Glue, Car L. & N. 91,293 | 30,240 lbs. | |
| | 70,080 lbs. | |
| at 7.20 f. o. b. Cairo | | $5,045.76 |
| 280 bags at 15 cts | | 42.00 |
| | | $5,087.76 |
| Less frt. to Cairo | 175 39 | |
| | 183.26 | |
| | 183 26 | 358 65 |
| | | $4,729 11 |
| | | 358 65 |

Bills Lading Enclosed.
Items O. K. Nelson Windsor.
Prices O. K. C. F. Royce.
Extensions O. K.
Charge Poplar Bluff.
Paid July 10, 1905.
Receipt and return to 184 Front Street New York.
Received payment with thanks. F. G. Perkins, Agent, by Catherwood.

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[fol. 939] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 6"

Mr. Lowell M. Palmer, Esq., 184 Front Street, New York,
Bought of F. G. Perkins, Agent for Planters Manufacturing Company, 192 Fulton Street, New York.

July 6, 1905.

| | | | |
|---|---|---|---|
| 61960# Perkins' Veneer Glue 7 1/5c | | 4461.12 | |
| 285 bags each | 15c | 42.75 | |
| | | | $4503 87 |
| Less freight to Cairo | | | 371.76 |
| | | | $4132 11 |

Car No. S. P. 83689
Items O. K. Nelson Windsor.
Prices, O. K. G. F. Royce.
Extensions O. K. O. K. L. M. P. Rush.
Charge Poplar Bluff.
Paid August 7, 1905.
Receipt & return to 184 Front St., N. Y.
Received payment Aug. 9, '05. Frank G. Perkins, Agent.

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"Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 6-A"

Remit to Perkins, 121 E. 51st Street, Chicago, Ill.

Paid Aug. 7th, 1905.

[fol. 940] "Defendants, Exhibit Brooklyn Cooperage, Invoice and Papers No. 7"

Mr. Lowell M. Palmer, Esq., 184 Front Street, New York,
Bought of F. G. Perkins, Agent for Planters' Manufacturing Company, 192 Fulton Street, New York.

August 5th, 1905.

| | | |
|---|---|---|
| 305 bags Perkins Veneer Glue 64720# at 7.2c per lb. | 4659.84 | |
| 305 bags at 15c each | 45.75 | |
| | 4705.59 | |
| Less freight to Cairo 30c per 100 | 232.99 | |
| | | 4472.60 |
| Less amount statement attached | | 755.24 |
| | | 3717.36 |

Car N. Y. C.—91591.
Items O. K.
Prices O. K. G. F. Royce.
Extensions O. K.
Charge Poplar Bluff.
B. L. & Memo. sent 8/14/05.
Paid August 21, 1905. Receipt and return to 185 Front Street, N. Y.
Received payment. F. G. Perkins, Agent.

[fol. 941] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 7-A"

Statement

G. L. Folio —. P. L. Folio —

F. G. Perkins in Account with the Brooklyn Cooperage Company, Manufacturers of Flour, Sugar, Fruit, Oil and Syrup Barrels, Also Molasses, Rum, Wine and Alcohol Shooks for Export, 184 Front St., Cor. Burling Slip, New York.

August 21, 1905.

To following lots of glue shipped from Poplar Bluff to Cairo, Ill.:

| | | | |
|---|---|---|---|
| May | 15, 1280 lbs. | 6 | bags. |
| " | 19, 5600 " | 20 | " |
| June | 10, 3250 " | 15 | " |
| | 10,130 " at 7.2c f. o. b. Cairo | | |
| | add frt. to P. B. at 18c | 18 | |
| | | .0738 | 747.59 |
| | 41 bags at .15 | | 6.15 |
| | Cartage | | 1.50 |
| | | | 755.24 |

[fol. 942] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 8"

R. M. Parker, Agent, Poplar Bluff, Mo., to F. G. Perkins, Manufacturer of Special Glues, South Bend, Ind., Dr.

Please remit to 211 N. Lafayette St.

June 4th, 1907.

| | | |
|---|---|---|
| 430 Bags Veneer Glue 59,270# at 7.35c per lb. | 4356.34 | |
| 430 bags 10c. | 43. | |
| | | $4399.34 |
| Less freight | | 334.73 |
| | | 4064.61 |

P. M. #6475.
Items O. K.
Prices O. K. P. Handle.
Extensions O. K.
Charge Poplar Bluff.
Paid 23, July 1907.
Receipt & return to 117 Wall St., N. Y. City
Received Payment. F. G. Perkins.

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[fol. 943] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 8-A"

R. M. Parker, Agent, Poplar Bluff, Mo., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. Lafayette St., South Bend, Indiana.

July 15th, 1907.

(Supplemental to our invoice June 4th, 1907)

| | |
|---|---|
| To 13 bags Veneer glue—1,300 lbs. at 7.35c. | $95 55 |
| " 13 bags—at 10c. | 1 30 |
| | $96 85 |

Items O. K.
Prices O. K. P. handle.
Extensions O. K.
Charge Poplar Bluff.
Paid July 23rd, 1907.
Receipt & return to 117 Wall St. N. Y. City.
Received Payment. F. G. Perkins.

"Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 9"

R. M. Parker, Agent, 117 Wall St., N. Y., to F. G. Perkins, Dr.

September 27th, 1907.

Part of your order August 12th, 1907:

| | | |
|---|---|---|
| To 357 bags Light Body Veneer Glue 34,516 lbs. at 7.35 c. | $2,536 93 | |
| To 357 bags at 10c. | 35 70 | |
| | | $2,572 63 |
| Less frt. | | 100 00 |
| | | $2,472 63 |

(Mo. Pacific Car #15411.)
(Balance of order on road.)
Paid Nov. 4, 1907 10/25/07 L.
Receipt & return to 117 Wall St., N. Y. City. C. Langlotz.

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[fol. 944] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 9-A"

R. M. Parker, Agent, 117 Wall Street, New York, to F. G. Perkins, Dr.

September 27, 1907.

Part of your order August 12th, 1907:

| | | |
|---|---|---|
| To 357 bags Light Body Veneer Glue 34,516 lbs. at 7.35c. | $2,536 93 | |
| To 357 bags at 10c. | 35 70 | |
| | | $2,572 63 |

(Mo. Pacific Car #15411.)
(Balance of order on road.)
Duplicate.

"Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 9-B"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

September 27th, 1907.

Part of your order August 12th, 1907:

| | |
|---|---|
| To 357 bags Light Body Veneer Glue 34,516 lbs. | |
| at 7½c. | $2,588 70 |
| To 357 bags, at 10c. | 35 70 |
| | $2,624 40 |

(Mo. Pacific Car #15411.)
(Balance of order on road.)
Received O. K. Charles Langlotz.
Prices O. K.
Extensions O. K..

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[fol. 945] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 9-C"

Frank G. Perkins, Manufacturer, Special Veneer & Furniture Glues

Please address reply to Lake Mary, Fla.

R. M. Parker, Esq. Agent, 117 Wall Street, N. Y.

Dear Sir: Enclosed please find corrected invoice, per your letter of Oct. 14th, which was forwarded to me here. Thank you for calling my attention to the matter.

I expect to be here for a time and I will ask you to make the remittance to me at this point.

Yours very truly, F. G. Perkins.

FGP.-S.G.
Two enclosures.

"Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 10"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Dr.

Oct. 18th, 1907.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

| | | |
|---|---|---|
| To 219 Bags Glue 54,750 lbs. at 7.35c | $4024 13 | |
| To 219 bags at 10c | 21 90 | |
| | | $4046 03 |
| Less for 406 lbs. short at .0735 = | 29 84 | |
| Freight | 283 71 | |
| | | 313 55 |
| | | $3732 48 |

Shipped from Lake Mary, Fla. A. C. L. Car #30737.
Received payment Nov. 26, 1907.
Paid Nov. 25th, 1907.
Receipt & return to 117 Wall St., N. Y. C.

F. G. Perkins.

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[fol. 946] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers No. 10-A"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Dr.

Oct. 18th, 1907.

Please remit to 211 N. Lafayette St., South Bend, Indiana.

| | | |
|---|---|---|
| To 219 Bags Glue 54,750 at 7.35 | $4024 13 | |
| To 219 Bags at 10c | 21 90 | |
| | | $4046 03 |
| Less 406 lbs. short | 29 84 | |
| " freight | 283 71 | |
| | | 313 55 |
| | | $3732 48 |

Paid Nov. 25, 1907.
Shipped from Lake Mary, Fla. A. C. L. Car #30737.

Copy Chas. Langlotz.

[fol. 947] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE, INVOICE AND PAPERS NO. 10-B"

Office of R. M. Parker, Agent, Poplar Bluff, Mo.

11-19-07.

R. M. Parker, Agent, 117 Wall Street, New York City.

DEAR SIR: We have received from F. G. Perkins in car A. C. L. 30737, 219 bags of Cassava glue, as follows:

| | |
|---|---|
| Gross-weight | 54563 lbs. |
| Tare (219 bags) | 219 " |
| Net | 54344 " |

The net weight, you will notice is 406 pounds less than is called for in the invoice, which we return herewith to you.

We have very carefully weighed all this glue, and feel very sure that our weight is correct.

We have paid the freight on this glue, which amounted to $283.71 paid freight bill for which we enclose herewith.

Yours respectfully, Charles Langlotz.

2 Encl.
P. H.

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[fol. 948] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE, INVOICE AND PAPERS NO. 11"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

November 29, 1907.

| | | |
|---|---|---|
| (Your order November 4th, 1907:) | | |
| To 148 bags glue 40,755 lbs. at 7.35c | $2995 49 | |
| To 148 bags at 10c | 14 80 | |
| | | $3010 29 |
| Less freight | | 179 30 |
| | | $2,830 99 |

Shipped in L. S. & M. S. Car #44049.
Received O. K. Charles Langlotz.
Prices O. K.
Extensions O. K.
E. pay 2902.79.
Paid Jan. 4, 1908. F. G. Perkins. S.

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[fol. 949] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 11-A"

R. M. Parker, Agent, 117 Wall Street, New York, to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

December 12, 1907.

| | | |
|---|---|---|
| To 10 Bags Glue 1,000 lbs. at 7.35c per lb.. | $73.00 | |
| To 10 Bags at 10c | 1.00 | |
| | | $74.50 |
| Less freight | | 2.70 |
| | | $71.80 |

Received O. K. C. L.
Prices O. K. C. L.
Extensions O. K.
Items O. K.
Prices O. K.
Extensions O. K. Handle.
Charge Poplar Bluff.
Receipt & Return to 117 Wall St. N. Y. City.
Paid January 4, 1908. F. G. Perkins.
E. pay of 2902.79.

[fol. 950] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 11-B

Office of R. M. Parker, Agent, Poplar Bluff, Mo.

12-18-07.

R. M. Parker, Agent, 117 Wall Street, New York City.

Dear Sir: Enclosed herewith please find invoice 148 bags glue received from F. G. Perkins which amounts to $3,010.29, also the freight bill on this glue which we have paid here, and which amounts to $179.30. This car glue checked O. K. as to weight.

Yours respectfully, Charles Langlotz.

Paid Jan. 4, 1908.
Encl.

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[fol. 951] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No 11-C"

Office of R. M. Parker, Agent, Poplar Bluff, Mo.

12-26-07.

R. M. Parker, Agent, 117 Wall Street, New York City.

Dear Sir: Enclosed herewith please find invoice in duplicate for ten bags glue, which was shipped by F. G. Perkins to us from Cairo, to tide us over an emergency, owing to a delay in receiving the last carload of glue, same having been delayed considerably in transit, and Mr. Perkins being in Poplar Bluff at the time, wired the Singer Co. at Cairo and had them ship this glue to us, in order to enable us to keep up our output, until the above mentioned car arrived. Also enclose paid freight bill, amounting to $2.70 which we paid here.

I make this explanation because this small shipment by local freight was not ordered by the New York office in the usual manner.

Yours respectfully, Charles Langlotz.

Encl.

P. S.—The above mentioned local shipment of glue was heavy body.

Paid Jan. 4/08.

[fol. 952] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 12"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. Lafayette St., South Bend, Indiana.

January 2, 1908.

(Your order December 17, 1908:)

| | | |
|---|---|---|
| To 347 bags glue 60,050 lbs. at 7.35c | $4,413.68 | |
| To 347 bags at 10c | 34.70 | |
| | | $4,448.38 |
| Less 183 lbs. 7.35 | 13.45 | |
| Freight | 330.28 | |
| | | 343.73 |
| | | $4,104.73 |

E.

Shipped to Poplar Bluff, Mo.
Car, Wabash 62712.
January 2, 1908.
Paid Feb. 5, 1908. Receipt & Return to 117 Wall St., N. Y. City.
Paid Feb. 9, 1908. F. G. Perkins, G. S. P.

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"DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 12-A"

Office of R. M. Parker, Agent, Poplar Bluff, Mo

1-21-08.

R. M. Parker, Agent, 117 Wall Street, New York City.

DEAR SIR: I return herewith invoice from F. G. Perkins for 347 bags of glue contained in car Wabash 62,712, which glue weighed 59,867, lbs., which is 183 lbs. less than the invoice calls for.

Also enclosed paid freight bill on this car of glue amounting to $330.28, which has been paid by this office.

Your respectfully, Charles Langlotz.

Encl.
Paid Feb. 5, 1908.

[fol. 953] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS, No. 12-B"

(Duplicate)

R. M. Parker, Agent, 117 Wall St., New York, to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

January 2, 1908.

(Your order December 17, 1908:)

| | | |
|---|---|---|
| To 347 bags glue 60,050 lbs. at 7 35 | $4,413.68 | |
| To 347 bags at 10c | 34.70 | |
| | | $4,448.38 |
| Less 183 lbs. at 7.35c | 13.45 | |
| " freight | 330.28 | |
| | | 343.73 |
| | | $4,104.65 |

Shipped to Poplar Bluff, Mo.
Car, Wabash 62,712.
January 2, 1908.
Paid Feb. 5, 1908.

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[fol. 954] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 13"

R. M. Parker, Agent, 117 Wall Street, New York, to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

March 25, 1908.

(Your order February 24, 1908:)

To one car veneer glue:

| | | |
|---|---|---|
| 20,000 lbs. H. B. Glue | | |
| 40,000 " L. B. " 724 lbs. short | | |
| [60,000]* " " | 4,356.79 | |
| 59,276 " at 7.35c | [$4410.00]* | |
| To 300 Bags at 10c | 30.00 | |
| | | [$4440.00]* |

[*Erased in copy.]

| | |
|---|---|
| Actual gross weight 59,276 lbs | 4,386.79 |
| Less freight | 330.00 |
| | $4,056.79 |

In Duplicate per your request 10/14/07
Paid April 17, 1908.
Dup. to P. T. C. 3/26/07.
Items O. K.
Prices O. K. H. C. Smith.
Extensions O. K.
Charge Poplar Bluff, Mo.
Paid Apr. 22, 1908. F. G. P.

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[fol. 955] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 13-A"

R. M. Parker, Agent, 117 Wall Street, New York, to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

March 25th, 1908.

(Your Order February 24, 1908:)

To one car veneer glue:

| | | |
|---|---|---|
| 20,000 lbs. H. B. Glue | | |
| 40,000 " L. B. " | | |
| 60,000 " " at 7.35c | $4,410.00 | |
| To 300 Bags at 10c | 30.00 | |
| | | $4,440.00 |

In Duplicate per your request 10/14/07.
Received O. K.
Prices O. K.
Extensions O. K.
Paid April 17, 1908.

[fol. 956] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 13-B"

Office of R. M. Parker, Agent, Poplar Bluff, Mo.

4-11-08.

R. M. Parker, Esq., New York, N. Y.

Dear Sir: The car of Cassava glue referred to in the enclosed bill has been received.

While the number of bags in the car corresponds with the number invoiced, the gross weight ascertained by careful weighing on our scales, is 59,276 instead of 60,000 lbs., according to the invoice.

Yours very truly, W. N. Barron, Manager.

Encl.
Paid April 17, 1908.

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[fol. 957] "Defendants' Exhibit Brooklyn Cooperage Invoice Papers No. 14"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

#512

Please remit to 211 N. LaFayette St., South Bend, Indiana.

April 25th, 1908.

(Your order April 14th, 1908:)

| | | |
|---|---|---|
| To 300 Bags Veneer Glue 60,000 lbs. at 7.35¢ | $4410 00 | |
| To 300 Bags at 10¢ | 30 00 | |
| | | $4440 00 |
| Order filled ¼ H. ¾ L. 295 lbs. | | 21 68 |
| | | $4461 68 |
| Freight | | 331 30 |
| | | $4130 38 |

Paid May 15, 1908.
From Lake Mary Factory 4/25/08.
Car A. C. L. #27489.
B/L to Poplar Bluff, Mo.
Paid May 18, 1908. F. G. Perkins.
Received O. K. W. N. B.
Prices O. K.
Extensions O. K.

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[fol. 958] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 14-A"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. LaFayette St., South Bend, Indiana.

April 25th, 1908.

(Your order April 14th, 1908:)

Dup. sent Mr. Barron, Mgr., 4/30/08.

| | | |
|---|---|---|
| To 300 Bags Veneer Glue 60,000 lbs. at 7.35¢ | $4410 00 | |
| To 300 Bags at 10¢ | 30 00 | |
| | | $4440 00 |
| Order filled ¼ H. ¾ L. Less Freight | | 331 30 |
| | | $4108 70 |
| From Lake Mary Factory 4/25/08 Add 295 lbs at 7.35 | | 21 68 |
| | | $4130 38 |

Items O. K.
Prices O. K. H. C. Smith.
Extensions O. K.
Charge Poplar Bluff, Mo.
Car A. C. L. #27489.
B/L to Poplar Bluff, Mo.
Paid May 15th, 1908.

[fol. 959] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 15"

R. M. Parker, Agent, 117 Wall Street, New York, F. G. Perkins, Manufacturer of Special Glues, =1 Gramercy Park, N. Y. City, Dr.

Please remit to 211 N. LaFayette St., South Bend, Indiana.

June 13, 1908.

| | | |
|---|---|---|
| 429 Bags Veneer Glue 70,531 lbs. at 7.35¢ | $5,184 03 | |
| 429 Bage at 10¢ | 42 90 | |
| | | $5,226 93 |
| Less freight | | 196 51 |
| | | $5,030 42 |
| Less 25 lbs. short at 7.35¢ | | 1 84 |
| | | $5,028 58 |

Packed 1/3 Heavy Body Glue.
2/3 Light " "
Items, O. K.
Prices O. K. H. C. Smith.
Extensions O. K.
Charge Poplar Bluff.
Paid July 13, 1908.
Paid July 15, 1908. F. G. Perkins.

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[fol. 960] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 15-A"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. LaFayette St., South Bend, Indiana.

June 13th, 1908.

| | | |
|---|---|---|
| 429 Bags Veneer Glue 70,531 lbs. at 7.35¢ | $5,184 03 | |
| 429 Bags at 10¢ | 42 90 | |
| | | $5,226 93 |
| 70506 lbs. at 7.35 | | 5,182 19 |

| | |
|---|---|
| Packed 1/3 Heavy Body Glue Bags ..... | 42 90 |
| 2/3 Light " " ..... | 5,225 09 |
| Less freight ..... | 196 51 |
| | $5,028 58 |

70531
70506

25 short.

Received O. K.
Prices O. K.
Extensions O. K.
Paid July 13, 1908.

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[fol. 961] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 15-B"

The Brooklyn Cooperage Company, Manufacturers of Flour, Sugar, Fruit, Oil & Syrup Barrels; Also Molasses, Rum, Wine, and Alcohol Shooks for Export, 117 Wall St. Cor. South St., New York

Dealers in Staves, Heading, Hoops, Second-hand Molasses Hhds., and Cooperage Material Generally

R. M. Parker, President; C. R. Heike, Secretary; Arthur Donner, Treasurer

Cable Address: Engeldon, N. Y.

July 2nd, 1908.

Mr. W. N. Barron, Mgr., Poplar Bluff, Mo.

DEAR SIR: Referring to your favor of the 29th ult., advising outturn in weight of car of glue from Perkins, kindly advise us the amount of freight paid on this car as requested in our letter to you of June 17th, as this is necessary for us to know, before we pay Perkins' bill.

Yours truly, H. C. Smith.

Freight $196.51.

"Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 15-C"

July 2nd, 1908.

Mr. W. N. Barron, Mgr., Poplar Bluff, Mo.

Dear Sir: Referring to your favor of the 29th ult., advising outturn in weight of car of glue from Perkins, kindly advise us the amount of freight paid on this car as requested in our letter to you of June 17th, as this is necessary for us to know, before we pay Perkins' bill.

Yours truly, —— ——.

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[fol. 962] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 15-D"

June 17th, 1908.

Mr. W. N. Barron, G. M., Poplar Bluff, Mo.

Dear Sir: We enclose duplicate bill from G. H. Perkins for carload of glue. We think it advisable that you trace this car from your end, to avoid any delay, altho we have assurances from Mr. Perkins that the usual tracers have been placed on the car.

Kindly advise upon arrival the out-turn of weight and freight paid and oblige,

Yours truly, —— ——.

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"Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 16"

R. M. Parker, Agent, 117 Wall Street, New York, to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

7/27/1908.

| | | |
|---|---|---|
| To 1 Car veneer Glue 330 Bags 60,000 lbs. at 7.35 | $4,410 00 | |
| 330 Bags at 10c. | 33 00 | |
| | | $4,443 00 |
| Less freight | | 330 00 |
| | | $4,113 00 |

From Factory 7/27/08.
Car A. C. L. #25763. Paid Aug. 18, 1908.
B/L to Poplar Bluff, Mo.
Items, O. K.
Prices O. K. H. C. Smith.
Extensions O. K.
Charge Poplar Bluff, Mo.
Receipt and Return to 117 Wall St., N. Y. City.
Paid Aug. 21, 1908. F. G. Perkins.

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[fol. 963] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 16-A"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

7/27/08.

To 1 Car Veneer Glue:

| | | |
|---|---|---|
| 330 Bags, 60,000 lbs. at 7.35c | $4410 00 | |
| 330 Bags at 10c | 33 00 | |
| | | $4443 00 |

Duplicate.
From Factory 7/27/08.
Car A. C. L. #25763.
B/L to Poplar Bluff, Mo.
Paid Aug. 18, 1908.
Paid Aug. 21, 1908. F. G. Perkins.
32938 L.
27062 H.

[fol. 964] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 17"

Mr. R. M. Parker, Agent, Poplar Bluff, Mo., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

November 13, 1908.

| | | |
|---|---|---|
| Your order October 27th, File 288: | | |
| 300 Bags Glue 60,000 lbs. at 7.35 | $4,410 00 | |
| 300 Bags at 10c | 30 00 | |
| | | $4,440 00 |
| Less Freight | | 330 00 |
| | | $4,110 00 |

Out from Factory Nov. 11, '08.
Car A. C. L. 25334.
B/L Attached.
Received O. K. P. Handle.
Prices O. K. D. T. Poole.
Extensions O. K. D. T. Poole.
Department Veneer.
Paid Dec. 7, 1908.
Receipt and return to 117 Wall St., N. Y. City.
Paid Dec. 12, 1908. F. G. Perkins.

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[fol. 965] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 18"

Mr. R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

January 2, 1909.

| | | |
|---|---|---|
| 600 Bags Veneer Glue 59092 | 4343 26 | |
| [60,000]* lbs. at 7.35c | [$4410 00]* | |
| 600 Bags at 10c | 60 00 | |
| | | $4403 26 |
| | | [4470 00]* |
| Less freight | | 84 00 |
| | | $4319 26 |

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[*Erased in copy.]

Shipped from St. Louis 1/2/09.
In Penn. Car #536428.
Paid Jan. 21, 1909.

12,297 lbs. (gross) heavy.
49,727 " " light.

60,024 "
Less tare 932 "

59,082 at 7.35

Paid Jan. 22, 1908. F. G. Perkins.
Dup. sent Poplar Bluff 1/11/09.
Items O. K.
Prices O. K.
Extensions O. K.
Charge Poplar Bluff, Mo.

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[fol. 966] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS NO. 18-A"

R. M. Parker, Agent, 117 Wall Street, N. Y., to F. G. Perkins, Manufacturer of Special Glues, Dr.

Please remit to 211 N. La Fayette St., South Bend, Indiana.

January 2nd, 1909.

600 Bags Veneer Glue 60000 lbs. at 7.35c $4410 00
600 Bags at 10c ..... 60 00

$4470 00

Shipped from St. Louis 1/2/09.
In Penn. Car #536428.
Received O. K.
Prices O. K.
Extensions O. K.
Department.
Paid Jan. 21, 1909.
Duplicate.
C49727
H10297

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60024

"Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 19"

4/29/09.

Dear Smith: Enclosed find F. G. Perkins' bill for glue which has been received O. K. As we only pay our freight bills twice a month, the freight on this shipment $342.65 has not as yet been paid and have been holding the bill up for that reason.

H. C. S.

If the goods called for on this invoice have been received, check the bill and return to New York Office for payment.

Brooklyn Cooperage Company

P. H.—Please check the bill for last car of glue, advising freight paid and return at once. H. C. S.

---

[fol. 967] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 19-A"

Frank G. Perkins, Manufacturer of Special Glues, Sold to Messrs. R. M. Parker, Agt., 117 Wall St., New York City
Our order No. 547.
Shipped to Poplar Bluff Mo. South Bend, Indiana, 4/2/09
Date of shipment 3/29/09.
Duplicate.
300 Bags Glue:
Gross weight 62,119 lbs.
Take 3# to bag 90 "

| | | |
|---|---|---|
| 61,219 | " net at $7.35 per 100 lb. | 4,499.60 |
| 300 Bags at 10c | | 30.00 |
| | | 4,529.60 |
| Less freight | | 342.65 |
| | | 4,186.95 |

A. C. L. Car 27,897.
B/L mailed to Poplar Bluff.
100 Bags marked Heavy.
200 Bags marked light.
Car contained 19,980 lbs heavy
41,239 " light

61,219

Paid May 4, 1909.

---

[fol. 968] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 19-B"

Frank G. Perkins, Manufacturer Special Veneer & Furniture glues, Dean Building, South Bend Indiana

Water-proof Glue, Heat-proof Glue

May 3rd. 1909.

Mr. R. M. Parker, Agent, 117 Wall Street, New York, N. Y.

Dear Sir: If not asking too much we would consider it a great favor if you would send us check for your last shipment. We need it to meet some heavy payments which are shortly due, and if you can see your way clear to favor us it will be greatly appreciated.

Yours very truly, Frank G. Perkins per C. W. Rand.

CWR—GB.

HCS. What's the frt.?

---

[fol. 969] Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 20"

Frank G. Perkins, Manufacturer of Special Glues Sold to R. M. Parker, Agt., 177 Wall Street, New York City

Our order No. 572.
Via Freight.
Shipped to Poplar Bluff, Mo., South Bend, Indiana.

Aug. 30, 1909.

Date of shipment Aug. 27, 1909.

| | | |
|---|---|---|
| Aug. 27 300 Bags of Glue, Gross 61,275 lbs. | | |
| Tare 3 lb. to bag | 900 " | |
| Net | 60,375 lbs. at 7.35 | $4,437.56 |
| 300 Bags at 10c | | 30.00 |
| | | $4,467.56 |
| Less freight | | 402. |
| | | $4,065.56 |

Duplicate B/L to Poplar Bluff Mo. Receipt and return to Out from factory 8/27/09; Car A. C. L. 117 Wall St. N. Y. City.
=26320 100 Bags marked "H" 200 Bags marked "L".
Received payment Sept. 14/09. F. G. Perkins. per W. R.
Dup. sent to W. N. B. Sept. 2/09.
Terms, O. K.
Prices O. K. H. C. Smith.
Extensions O. K.
Charge Poplar Bluff.

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[fol. 970] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 20-A"

Frank G. Perkins, Manufacturer of Special Glues Sold to R. M. Parker, Agt., 117 Wall Street, New York City

Our Order No. 572.
Via Freight.
Shipped to Poplar Bluff, Mo., South Bend, Indiana, Aug. 30, 1909.
Date of Shipment Aug. 27, 1909.

| | | |
|---|---|---|
| Aug. 27—300 Bags of glue | | |
| Gross | 61,275 lbs. | |
| Tare 3 lb. to bag. | 900 " | |
| Net | 60,375 " at 7.35 | $4,437.56 |
| 300 Bags at 10c | | 30.00 |
| | | $4,467.56 |

Duplicate B/L to Poplar Bluff, Mo.
Out from Factory 8/27/09 Car A. C. L. #26320.
100 Bags marked "H" 200 Bags marked "L."

Duplicate
Received O. K. G. H.W.
Paid Sep. 13, 1909. Prices O. K.
Extensions O. K.
20,012 lbs. heavy Department
40,363 " light

Frt. . . . . $402.00

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[fol. 971] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 21"

Frank G. Perkins, Manufacturer of Special Glues, Sold to R. M. Parker, Agent, 117 Wall St., New York

Your Order No. File 288.
Our Order No. 590.
Via Freight.
Shipped to Poplar Bluff, Mo.
Date of Shipment Oct. 18, 1909.

South Bend, Indiana, Oct. 22, 1909.

Oct. 18, 300 Bags Glue:

| | | | | |
|---|---|---|---|---|
| Gross | 61,275 lbs. | | | |
| Tare 3 lbs. to bag | 900 " | | | |
| Net | 60,375 " | at 7.32 | 4,437 56 | |
| 300 Bags | | at .10 | 30 00 | |
| | | | | 4,467 56 |
| Less freight | | | | 403 68 |
| | | | | 4,063 88 |

Out from factory A. C. L. car 27150, B/L direct to Poplar Bluff.
Paid November 8, 1909. Frank G. Perkins, by E. C. D.
(100 bags marked "H").
(200 " " "L").
Items, O. K.

Prices, O. K. H. C. Smith.
Extensions O. K.
Charge Poplar Bluff, Mo.
Receipt & return to 117 Wall St., N. Y. City.
Dup. sent Barron 10/26/09.

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[fol. 972] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 21A"

Frank G. Perkins, Manufacturer of Special Glues, Sold to R. M. Parker, Agent, 117 Wall St., New York

Your Order No. File 288.
Our Order No. 590.
Via Freight.
Shipped to Poplar Bluff, Mo.
Date of Shipment Oct. 18, 1909.

South Bend, Ind., Oct. 22, 1909.

Oct. 18, 300 Bags Glue:

| | | | | |
|---|---|---|---|---|
| Gross | 61,275 lbs. | | | |
| Tare 3 lbs. to bag | 900 " | | | |
| Net | 60,375 " | at 7.35 | 4,437 56 | |
| 300 Bags | | at .10 | 30 00 | |
| | | | | $4,467 56 |
| Less freight | | | | 403 68 |
| | | | | $4,063 88 |

Out from factory A. C. L. car 27150, B/L direct to Poplar Bluff.
Paid Nov. 8, 1909.
(100 bags marked "H").
(200 " " "L").

Duplicate

Received { 19,990 lbs. Light / 40,385 " Heavy } Oct. 29/09. P. H.

[fol. 973] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE, INVOICE AND PAPERS, No. 22"

Frank G. Perkins, Manufacturer of Special Glues, Sold to Mr. R. M. Parker, Agt., 117 Wall St., New York

Your Order No. Letter 12/6/09.
Via Freight.
Shipped to Poplar Bluff, Mo.
Date of Shipment December 21, 1909.

South Bend, Ind., Dec. 22, 1909.

Dec. 21, 300 Bags Glue:
Gross Weight 61,275 lbs.
Tare 3# to bag 900 "

| | | | | |
|---|---|---|---|---|
| Net | 60,375 " | at 7.35 | 4,437 56 | |
| 300 Bags | | at .10 | 30 00 | |
| | | | | 4,467 56 |
| Less freight | | | | 229 10 |
| | | | | 4,238 46 |

Marked —.
100 Bags "H."
200 Bags "L."
Out from factory in P. & R. Car #3315.
12/21/09. B/L attached.
Items, O. K.
Prices O. K. H. C. Smith.
Extensions O. K.
Charge Poplar Bluff Mill.
Receipt & return to 117 Wall St., N. Y. City.
Dup. & B/L sent to W. N. B. 12/24/09.
Paid Jan. 11, 1910. Frank G. Perkins, by E. C. D.
Thanks.

[fol. 974] "Defendants' Exhibit Brooklyn Cooperage, Invoice and Papers, No. 22A"

Frank G. Perkins, Manufacturer of Special Glues, Sold to Mr. R. M. Parker, Agent, #117 Wall St., New York

Your Order No. Letter 12/6/09.
Via Freight.
Shipped to Poplar Bluff, Mo.
Date of Shipment Dec. 21/09.

South Bend, Indiana, Dec. 22, 1909.

Dec. 21, 300 Bags Glue:
Gross Weight 61,275 lbs.
Tare 3# to bag 900 "

| | | | | |
|---|---|---|---|---|
| Net | 60,375 " | at 7.35 | 4,437 56 | |
| 300 Bags | | at .10 | 30 00 | |
| | | | | 4,467 56 |

Marked —.
100 Bags "H."
200 Bags "L."
Out from factory in P. & R. Car #3315. 12/21/09. B/L attached
Paid Jan. 11, 1910.

Duplicate

20,470 lbs. Heavy }
39,905 " Light }
Received 1/6/10. O. K.

60,375 "

P. Handle frt. 229 10

[fol. 975] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 23"

Frank G. Perkins, Manufacturer of Special Glues, Sold to Mr. R. M. Parker, Agt., 117 Wall St., New York

South Bend, Indiana, Mar. 21, 1910.

Your Order No. Letter 3/4/10.
Via Freight.
Shipped to Poplar Bluff, Mo.
Date of Shipment March 11, 1910.

| | | | | |
|---|---|---|---|---|
| Mar. 11, 400 Bags Glue: | | | | |
| Gross | 60800 lbs. | | | |
| Tare 2# to bag | 800 " | | | |
| Net | 60000 " | at 7.35 | 4410.00 | |
| 400 Bags | | at .10 | 40.00 | |
| | | | | 4450.00 |

Out from factory at Lansdale, Pa. in C. St. P. M. & O. car #27430 March 11, 1910. B/L direct.

| | |
|---|---|
| Less Freight | 228.00 |
| | 4222.00 |

240 Bags marked "L."
160 " " "H."
Items O. K.
Paid April 4, 1910.
Prices O. K. H. C. Smith.
Extensions O. K.
Charge Poplar Bluff Mill.
Dup. sent to W. N. B. 3/23/10.
Receipt & return to 117 Wall St. N. Y. City.
Paid Apr. 7, 1910. F. G. Perkins.

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[fol. 976] "DEFENDANTS' EXHIBIT BROOKLYN COOPERAGE INVOICE AND PAPERS No. 23-A"

If the goods called for on this invoice have been received, check the bill and return to New York Office for payment.

Brooklyn Cooperage Co.

Kindly advise freight paid.
$228.00 Frt.

"Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 23-B"

Frank G. Perkins, Manufacturer of Special Glues, Sold to R. M. Parker, Agent, 117 Wall St., New York

South Bend, Indiana, Mar. 21, 1910.

Your Order No. Letter 3/4/10.
Via Freight.
Shipped to Poplar Bluff, Mo.
Date of shipment March 11, 1910.
Mar. 11, 400 Bags Glue:

| | | | |
|---|---|---|---|
| Gross | 60800 lbs. | | |
| Tare 2# to bag | 800 lbs. | | |
| Net | 60000 lbs. at 7.35 | 4410.00 | |
| 400 Bags | at .10 | 40.00 | |
| | | | 4450.00 |

Out from factory at Lansdale, Pa. in C. St. P. M. & O. car #27430 Mar. 11, 1910. B/L direct.
240 bags marked "L."
160 " " "H."
Paid April 4, 1910.
Received O. K. P. H.
Prices O. K.
Extensions O. K.
Department Veneer.
Frt. 228.00 36000 lbs. light
24000 " heavy
60000 "

[fol. 977] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 24"

Frank G. Perkins, Manufacturer of Special Glues. Sold to R. M. Parker, Agent, 117 Wall Street, New York City

Via P. & R. N. Y. C. L. S, CCC & St. L.—St. L. & I. M. at Cairo.

Shipped to Poplar Bluff, Mo.

South Bend, Ind., June 28, 1910.

Date of Shipment June 28, 1910.

402 Bags Glue:

| | | | | |
|---|---|---|---|---|
| Gross Weight. | 60,804 lbs. | | | |
| Tare 2# per bag | 804 " | | | |
| | 60,000 " | at 7.35¢.. | 4410 00 | |
| 402 Bags | | at 10¢.. | 40 20 | |
| | | | | 4450 20 |
| Less Freight | | | | 228 00 |
| | | | | 4222 20 |

Shipped from Lansdale, Pa. in P & R car #2159.

134 Bags marked "H."
268 " " "L."
Paid July 15th, 1910.
Items O. K.
Prices O. K. H. C. Smith.
Extensions O. K.
Charge, Poplar Bluff.
Dup. sent to W. N. B. 7/1/10.
Receipt & Return to 117 Wall St. N. Y. City.
Paid July 16, 1910. F. G. Perkins, by S. D. Taylor.

[fol. 978] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 24-A"

Frank G. Perkins, Manufacturer of Special Glues. Sold to R. M. Parker, Agent, 117 Wall Street, New York City

402 Bags Glue:

| | | | | |
|---|---|---|---|---|
| Gross Weight. | 60,804 lbs. | | | |
| Tare 2# per bag | 804 " | | | |
| | 60,000 " | at 7.35¢.. | 4410 00 | |
| 402 Bags | | at 10¢.. | 40 20 | 4450 20 |
| Less Freight | | | | 228 00 |
| | | | | 4222 20 |

Shipped from Lansdale, Pa. in P & R car #2159.

134 Bags marked "H."
268 " " "L."
Received O. K. P. H.
Prices O. K.
Extensions O. K.
Department, Veneer.
Freight $228.00.
Paid July 15th, 1910.

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"Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 24-B"

Philadelphia & Reading R. R. Co.

March 12, 1910.

From Frank G. Perkins.

6th class
39

Poplar Bluff, Mo.
Consigned to Brooklyn Cooperage Co.,
Destination Poplar Bluff, State of Mo., County .....
Car Initial C. St. P. M. & O.
Car No. 27430.

No. of packages Description of Articles Wt.-Sub to Cor. and Special Marks.

60,000

400 Bags Cassova (Marked L. & H)
N. Y. C. at Harlem Lake Shore.
C. C. C. & St. L.—St. L. I. M. at
Cario, Butler Co., R. R. delivery.
Frank G. Perkins, Shipper, per A. A. Soules
H. M. Fret, Agent. Per L.

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[fol. 979] "Defendants' Exhibit Brooklyn Cooperage Invoice and Papers No. 25"

Night Message

The Western Union Telegraph Co.

Received at the Western Union Building 195 Broadway, N. Y. Feb. 23, 1905.

M 137 UH MD 13 Paid Nite Feb 23—
Poplar Bluff Mo Feb 23—

Lowell M. Palmer,
184 Front Str. New York.

Letter containing full report on new glue should reach you morning twenty fourth.

Nelson Windsor—1112 pm

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"Defendants' Exhibit Brooklyn Cooperage Invoice and Papers, No. 25-A"

Night Message

The Western Union Telegraph Co.
Received at the Western Union Building 195 Broadway, N. Y. 9374
X47A
VK AW 30 Paid Nite 1140PM
Poplarbluff Mo Feb 23

Lowell M. Palmer,
184 Front Street, New York.

Your tests proving better adhesion and lower cost I consider farley won contract per agreement will leave Tuesday for New York returning here for tight barrel work if you desire.

F. G. Perkins.

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[fol. 980] Plaintiff's Exhibit 83, German Patent Office Papers

Certification

To the firm Perkins Glue Company, of Lansdale, Pennsylvania, U. S. A., which has filed an application for patent in the German Empire for

"Glue and Process of Making the same"

November 4, 1911, it is certified that the attached papers are identical with the original papers found in the file of this patent application, namely, the Preliminary Discussion of January 5, 1912, the decisions of May 28, 1912, October 24, 1912, November 4, 1912, November 25, 1913, December 21, 1914 and with the patent claims, on the basis of which the patent has been granted.

Berlin, January 14, 1915.

The President of the Imperial Patent Office. F. V. (Sgd.) Schafer. (Seal of Imperial Patent Office. P. 27783 IV/22i.)

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Copy

Imperial Patent Office

Berlin, January 5, 1912.

Preliminary Discussion in the Matter of Patent Application of the Firm Perkins Glue Company, of Lansdale, Regarding "Glue and Process of Making the Same," Filed November 4, 1911

In accordance with Sec. 21 of the Patent Laws, the applicant is summoned to reply to this preliminary discussion, hereinafter given, within two months.

If this explanation is not received at the Patent Office within the specified time, the application will be considered withdrawn, in accordance with Sec. 21, Par. 4, of the Patent Laws.

The degenerating of starch-containing materials in the wet way (therefore also Cassava), in such manner, that the starch containing substance is subjected for a longer period [fol. 981] to the action of 1% to 3% acid (sulphuric acid, or the like) at a temperature lying between 50° or 55,5°, then neutralized, dried, and thereafter dissolved into a glue solution with hot water or with the addition of a dilute caustic alkali, is known—compare the patents 110957 and 118089 of Class 89.

Instead of effecting the degeneration with acids, it is not new to employ oxidizing agents, such as sodium peroxide, etc.,—compare the patent 167275, Class 22i. P. 27783 IV/22i.

In view of the above, there is no patentable invention according to the opinion of the Examiner.

Imperial Patent Office, Application Department IV, (Sgd.) Dr. Lochner. To Patent Attorney Mr. Paul Muller, in Berlin, S. W. 11.

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Imperial Patent Office

Berlin, May 28, 1912.

**Decision**

The patent application of the firm Perkins Glue Company, filed November 4, 1911, for

"Glue and Process of Making the Same"

is refused on the ground of Sec. 22 of the Patent Laws.

**Reasons**

According to the application, starch is heated with sulphuric acid at about 54,5° C. and the resulting product is brought into solution with caustic alkalies or similarly acting mediums. Such a process shows no materially new

features in view of the cited processes of the patents 110957 and 118089 of Class 89k. Also according to these known processes, starch, previously treated with sulphuric acid is dissolved in an excess of alkali. What concentration in the alkali treatment is to be maintained is ascertained by the expert by means of simple tests: he will, from the beginning, not work with too dilute solutions, because the sticking power is naturally decreased in dilute solutions. Also the products made in a known manner by the dissolving of starch in cold or hot caustic alkali are designated "vegetable glues" (compare the beginning of cited patent 167275 of Class 22i) and it also appears obvious to apply such vegetable glues to the uses for which animal glues have been [fol. 982] mainly used up to the present time. And finally, as no new special technical effect is shown for the use of cassava starch, so, upon consideration of the petition of March 11, 1912, a new patentable invention can not be seen in what is still claimed.

An appeal may be taken against this decision in accordance with Sec. 26 of the Patent Laws, within one month after the notification. With the filing of the appeal, to cover the costs of the appeal, Mks. 20 are to be paid in to the till of the Patent Office, specifying the file number and the disposition of the money ("Appeal fees"),—postage and delivery prepaid. If this payment is not effected, the appeal will be considered as not taken.

If payment is made to the Postal Check Account of the Patent Office, Berlin No. 2, by means of paycard, the costs of the check transaction must be paid in addition to the due tax, that is, for payments up to Mks. 500,—12 Pfennige, and further 5 Pfennige for each additional Mks. 500.

If payment is made to the Postal Check account by means of transfer or postal check, the fee of 7 Pfennige, provided for in Par. 914 of the Regulation relating to Postal Check payments must be added to the tax due.

Imperial Patent Office, Application Department IV.
(Sgd.) Lehne.

To Patent Attorney Mr. Paul Müller, in Berlin S. W. 11.

Imperial Patent Office

Berlin, October 24, 1912.

In acknowledgment of the appeal taken, the publication of the application on the basis of the papers filed on September 26, 1912, will take place, but only after the modification of the claim 1, as follows:

"Process of making wood glue from starch by the action of caustic alkali, characterized thereby, that the factors influencing the operation, namely, kind of starch, concentration, time, temperature and method of stirring, are so adjusted to one another during the alkali treatment, that the resulting thread drawing product assumes the spreadibility necessary for the glueing of wood."

It appears probable that according to the claimed process a product can be obtained which possesses the sticking [fol. 983] power characteristic of animal glue, as brought out in the glueing of wood, while on the other hand this result was not to be foreseen from the cited literature. It might be said in opposition that the claims characterize no definite process, defined with sufficient sharpness from what is known, but characterize chiefly a problem without specifying the required means for its solution. By the applicant, however, it is shown by means of numerous examples, but the conditions vary under which the starch with the treatment with caustic alkali will produce a glue having the sticking power stated, so that it would not be justifiable to restrict the claims to single definite working processes. In the present case the definite feature of the invention is the result of the process. On the other hand the specification shows, that the possibility of processing starch by means of caustic alkali into a wood glue is explained in such a manner that the invention seems to be sufficiently made clear in the sense of the patent law.

The applicant is requested to agree with the proposed modification of the claim within a month and to give specific reasons of any possible objections.

Imperial Patent Office, Chamber of Appeals II.

(Sgd.) Robolski, Neuberg, Tohl, Hafner.

Also for Dr. Schrohe, absent from service.
To the Patent Attorneys, Messrs. Meffert & Dr. Sell, Berlin.

Imperial Patent Office.

Berlin, November 4, 1912.

The following decision is hereby served:

Complying with the request, the publication will be delayed for a period of three months.

The first annual tax of Mks. 30. is to be paid into the till of the Patent Office, specifying the file mark and the disposition of the money (1. Annual Tax), postage and delivery prepaid. If payment is made to the Postal Check Account of the Patent Office, Berlin No. 2, by means of pay-card, the costs of the check transaction must be paid in addition to the due tax, that is, for payments up to Mks. 500,— 12 Pfennige, and further 5 Pfennige for each additional Mks. 500. According to Sec. 24 of the Patent Law, the ap-[fol. 984] plication will be considered withdrawn if payment has not been made within the term of two months after the publication has taken place in the "Reichsanzeiger" (Imperial Gazette).

Imperial Patent Office, Chamber of Appeals II.
(Sgd.) Robolski.

The Patent Office, Chamber of Appeals II, has decided to grant the appeal of applicant, the firm Perkins Glue Company, of Lansdale, Pennsylvania, U. S. A., against the decision of the Application Department IV, of May 28, 1912, on the grounds of the decree of October 24, 1912, and to publish the application with the title "Process for the Manufacture of Wood Glue from Starch."

The date of application is set as November 4, 1911. The specification, together with the patent claims filed September 26, 1912, after the modification of claim 1, as per the before-mentioned decree, will be published.

Imperial Patent Office, Chamber of Appeals II.
(Sgd.) Robolski, Neuberg, Schrohe, Tohl, Hafner.

To Patent Attorneys, Messrs. Meffert & Dr. Sell, Berlin.

Imperial Patent Office

Berlin, November 25, 1913.

## Decision

The application of the firm Perkins Glue Company, of Lansdale, Pennsylvania, U. S. A., entered November 4, 1911, is hereby refused after due publication and examination of the objections raised to the applied for patent for "Process for the Manufacture of Wood Glue from Starch."

## Reasons

The Chamber of Appeals II of the Imperial Patent Office, which decided upon the publication of the present application, has recognized as unforeseen, the result of the process for which a patent is applied for, the securing of a product with the characteristic sticking power of animal glue, as brought out in the glueing of wood, after the preliminary [fol. 985] examination of literature cited as conflicting, in the procedings before the Chamber of Appeals. The cited conflicting literature was the patents 88468, 110,957, 118,089 and 167,275, as well as Breuer's "Cements and Adhesives," 1907, pp. 89 and 90. The Chamber of Appeals has recognized the determining feature of the discovery in the result of the process. To this position of the Chamber of Appeals, the wording of the specification also corresponds. Compare especially p. 1, the last paragraph and the one before it, and the last paragraph on page 4. The knowledge that a product having the sticking power of animal glue could be obtained from starch and caustic alkali appears, however, according to the testimony of the opponents to be not new. In the Chemical-technical Recipe Pocket Book for the whole wood industry, especially for the use of the woodcarver, cabinet maker and joiner, etc. by Wilhelm Schmidt, quoted by them, is found on p. 61 a formula for preparing a substance from starch and caustic alkali which is to be employed in place of animal glue. In view of the above it is no longer correct to say, as does the applicant in its reply to the objection of Otto E. Wolff, August 8, 1913, p. 2 at the bottom et seq., that "it was entirely unknown hitherto that in a solution of starch in alkali

and water there resides the sticking power of animal glue, a sticking power which so binds two pieces of wood together that when pulled apart, the separation takes place not in the glue layer, but in the wood along the fiber." Nor is it correct, as the applicant in the same communication says, p. 5, par. 3, that Apparatine is nowheres mentioned in the literature as a glue for joinery purposes. Naturally, the formula given in Schmidt's book will be so carried out that the product will have all the essential properties for the glueing of wood and give the best results as a wood glue. Such a modification of a known formula does not go beyond what would be expected and required in every practical working out of known formulas. In addition it is also known, as the opponents have pointed out, that the manner and duration of stirring the starch during its conversion by alkalies is of vital importance, compare e. g. the book of Schmidt quoted, p. 61 and Farben Zeitung 1910/11, 1, p. 47. The tests which are mentioned in reply to the objection of O. E. Wolff, of August 8, 1913, on page 3 at the bottom, also prove nothing in favor of the process applied for and in view thereof no new patentable invention can be seen in claim 1. Also no new features can then be recognized in [fol. 986] claims 2 and 3. For to convert a degenerated starch, changed in its molecular condition, into an adhesive is known, as applicant admits; and, for the use of a product not yet clearly soluble in hot water (in contradistinction to that which is above described as admitted), a new technical effect is also not shown on pp. 9-10 of the reply to the objections of Otto E. Wolff, the opinion of Dr. H. Wolff. The same holds for claim 3, concerning which it is to be observed, as the applicant does not deny that cassava belongs to the well known and much used kinds of starch.

Consequently, in the subject matter of the application a new patentable invention is not seen.

The patent sought is therefore refused.

An appeal may be taken against this decision in accordance with Sec. 26 of the Patent Laws, within one month after the notification. With the filing of the appeal, to cover the costs of the appeal, Mks. 20. are to be paid into the till of the Patent Office, specifying the file number and the disposition of the money ("Appeal Fees"),—postage

and delivery prepaid. If this payment is not effected, the appeal will be considered as not taken.

Imperial Patent Office, Application Department IV.

Sgd. Dr. Lehne.

1) To (Applicant) Patent Attorneys Messrs. Meffert & Dr. Sell in Berlin.

2) To (Opponent) the firm Otto E. Wolff, Chemical-technical Products Factory, in Berlin O 112, Frankfurter Allee 63.

3) To (Opponent) the firm Julius Lichtenberger & Co., Gum- & Vegetable Glue Factory, at Speyer on the Rhine.

4) To (Opponent) the firm Pfeiffer & Dr. Schwandner, at Ludwigshafen, on the Rhine.

5) To (Opponent) the "Collodin" Adhesive Works, formerly Gustav Wolff, at Mainkur, near Frankfort on the Main.

6) To (Opponent) the firm Louis Blumer, Chemical Factory at Zwickau, Saxony.

7) To (Opponent) the firm Ferdinand Sichel, Limmer Chemical Factory, in Limmer, near Hanover,—by Patent Attorney, A. W. Brock, in Berlin S. W. 11.

[fol. 987] Imperial Patent Office

Berlin, December 21, 1914.

The following decision is hereby rendered.

The patent runs from November 5, 1911.

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With the rendering of the decision, the annual patent fees not yet paid (compare Article 8 of the Patent Law) become due and should be paid within six weeks to the Cash Department of the Patent Office, postage and delivery prepaid, stating the file number and purpose of the remittance. After the expiration of this time, payment may only be made within the following six weeks, with the addition of a tax of 10 Marks.

If payment is made to the Postal Check Account of the Patent Office, Berlin No. 2, by means of a paycard, the costs of the check transaction must be paid in addition to the due tax, that is, for payments up to Mks. 500.-12 Pfennige, and further 5 Pfennige for each additional Mks. 500.

If payment is made to the Postal Check Account by means of transfer or postal check, the fee of 7 Pfennige, provided for in Par. 914 of the Regulation relating to Postal Check payments must be added to the tax due.

The patent expires if the taxes are not paid in full and in due time.

After registration in the Patent Register, the number of the patent will be communicated and as soon as the Patent Specification is printed, the Letters Patent will be transmitted.

Imperial Patent Office, Chamber of Appeals II.
(Sgd.) Dr. Thiel.

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In the matter of the appeal of the Perkins Glue Company, of Lansdale, Pennsylvania, U. S. A. (represented by Fr. Meffert & Dr. Sell, Patent Attorneys) from the decision of the Application Department IV. of November 25, 1913, denying the patent applied for, the Patent Office, Chamber of Appeals II has decided to grant the appeal, and, with a reversal of the assailed decision, to grant a patent on the basis of the published specification, with the title:

"Process for the Preparation of Wood Glue from Starch"

November 4th, 1911 is set as the filing date of the application.

[fol. 988] Reasons

The essence of the invention for which a patent is applied for is based upon the new conception that the action of caustic alkali upon starch may be so conducted that a product results which shares with animal glue the valuable property of so firmly cementing together two pieces of wood that upon tearing them apart, the separation does not take place in the joint, but in the wood itself. That this is possible, and especially that the examples given in the published specification lead to products with such properties, has been disputed by none of the opposing firms. The question arises therefore, whether this conception was actually new at the time of the filing of the said application, and especially also, whether it could have been derived from the publications cited by the opposing firms.

Referring first to the formula for a "Vegetable Glue" given in the Chemical-Technical Recipe Pocketbook of W. Schmidt, 1882, p. 61, upon which the rejection in the first instance was based, it contains no disclosure of the invention for which the patent is applied for. The positive assertion of the applicant, proven by comparative tests, that this formula does not lead to a product having the great binding power characteristic of a wood glue, has not been denied by the opposing side. In consequence, the statement in the publication in question, that the material is to be employed "for sizing all kinds of merchandise as well as for other industrial purposes and, especially also, in place of animal glue" is to be construed that such used are had in mind in which great mechanical binding power of the adhesive substance is not essential, as for example, the sizing of fabrics and the glueing of paper. The recommendation of the material as a substitute for animal glue is not at variance with this construction, since it is known that this adhesive substance is not only used for the joining of wood, but also for the above described purposes. It therefore appears that the point of view taken in the prior decision that it would be obvious to so modify the mentioned formula that a product possessing all the properties essential for a glue for wood would be obtained, is not sufficiently substantiated. To modify the formula in this sense requires first of all a clear comprehension of the above mentioned conception. Besides this, it is distinctly said of the formula, that the same gives the most favorable proportions, so that for this very reason it did not suggest the making of material modifications.

[fol. 989] It is not materially different with the other publications to which the expert Dr. Wolff refers. They only show the undisputedly known fact that starch may be worked, by means of degeneration with caustic alkali or similar mediums, into products, the so-called vegetable glues, which are suitable as substitutes for known adhesive substances, such as gums and glues for sizing purposes and the like. It is just as little disputed from these known facts that the claimed process used means and measures which are already in practice in the corresponding art. But it cannot be deduced from these publications that it would be possible to so influence the process during the

action of caustic alkali upon a given kind of starch by a relative adaptation of the respective factors (concentration, time, temperature and stirring method) that a preparation results, which can serve as a complete substitute for wood glue. In view of this the further allegations of the opposing parties with respect to claims 2 and 3, that starch degenerated to different degrees has already been used for a long time for the preparation of vegetable glue and that cassava starch is among the best known starches of commerce, are immaterial.

So the proof has not been produced by the opposing parties that the repeatedly mentioned conception upon which the invention rests, for which a patent is applied for, was not new. Therefore, the claimed process based thereon must be considered a patentable invention, in spite of the fact that known means are employed therein.

Some of the opposing firms however further assert that the claimed process had been previously publicly used by them. However, nothing has been brought forth that would make this assertion appear justified.

Although as to do so, the two firms, Julius Litchenberger & Co., and Louis Blumer, were not able to cite particulars from which the public knowledge of the prior use allegedly practiced by them and corresponding to the claimed process, could be deduced. The first mentioned firm even admitted that the formulæ books according to which the work was carried on by them, were kept in code. The alleged fact, that products, analogous to the preparations of the application, have for a considerable time been put on the market by the opposing parties, could not prove the open knowledge, since the character of the product does not in and of itself allow of a conclusion as to the method of its manufacture.

The firm Ferdinand Sichel Chemische Fabrik Limmer in its brief of May 16, 1914 (page 2) refuses to state sufficiently the method of operation used by it. It has therefore [fol. 990] failed to bring proof of the claimed identity of its process with that of the application. This identity cannot be assumed either, since otherwise the manifest keeping secret on the part of the opposing party of their method of operation, would not be understandable. An examination of the named witnesses was therefore useless.

With respect to the allegation of the opposing parties that the published claims do not characterize a definite process, the statement given in the main claim, to strive for the desired result by a relative adjustment of the working factors considered during the action of caustic alkali upon a definite kind of starch, is sufficient as a characterization of the process to be protected. How this adjustment is to be understood in order to obtain, from various kinds of starch, the product of the application, sharply defined by its characterization as wood glue, is clearly explained in the description with the help of numerous examples of the process so that no doubts can arise as to the nature of the process to be protected.

In view of these circumstances, the patent demanded is to be granted according to the published specification. Imperial Patent Office, Chamber of Appeals II,

(Sgd.) Dr. Thiel, Dr. Jungmann, Schrohe, Tohl, Hafner.

To Patent Attorneys, Messers F. Meffert & Dr. Sell, in Berlin.

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Berlin, December 21, 1914.

The following decision is hereby rendered.

(Decision and Reasons see supra Pages 14-19).

The submitted Recipe Pocket Book for the Whole Wood Industry is forwarded herewith.

Imperial Patent Office, Chamber of Appeals II,
Sgd. Dr. Thiel.

To the firm Otto E. Wolff, Chemical-Technical Products Factory in Berlin, O 112 Frankfurter Alee 63.

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Berlin, December 21, 1914.

The following decision is hereby rendered.

(Decision and Reasons see supra Pages 14-19)

Imperial Patent Office, Chamber of Appeals II,
Sgd. Dr. Thiel.

[fol. 991] To the firm Julius Lichtenberger & Co., Gums & Vegetable Glue Factory in Speyer on the Rhine.

To the firm Pfeiffer & Dr. Schwandner, in Ludwigshafen, Rhine.

To the "Collodin" Adhesive Works, formerly Gustav Wolff, in Mainkur, near Frankfort on the Main.

To the firm Louis Blumer, Chemical Factory in Zwickau, Saxony.

To Mr. August Waldemar Brock, Patent Attorney in Berlin: Opponent, firm Ferdinand Sichel, Limmer Chemical Factory.

P. A. 421915. Filed 9. 26. 12:

Perkins Glue Co.

Patent Claims

1. Process of making wood glue from starch by the action of caustic alkali, characterized thereby, that the factors influencing the operation, namely, kind of starch, concentration, time, temperature and method of stirring, are so adjusted to one another during the alkali treatment, that the resulting thread drawing product assumes the spreadibility necessary for the glueing of wood.

2. Process, according to claim 1, with preliminary treatment of the starch by hydrolizing or oxidizing substances, characterized by the fact that as starting material for the alkali treatment there is used a slightly degenerated product, not yet clearly soluble in hot water.

3. Process, according to claims 1 and 2, characterized by the fact that cassava is used as the starch containing material.

Sgd. Meffert.

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[fol. 992] DEFENDANTS' EXHIBIT No. 3

United States of America, Department of the Interior

To all to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the Records of this Office of the File Wrapper and Contents in the matter of the Letters Patent of Frank G. Perkins; Gertrude S. Perkins, Executrix of said Frank G. Perkins,

deceased, Assignor to Perkins Glue Company, Number 1,020,655, Granted March 19, 1912, for Improvement in Glue and Methods of Making the Same.

In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this 10th day of June, in the year of our Lord one thousand nine hundred and fourteen and of the Independence of the United States of America the one hundred and thirty-eighth.

R. F. Whitehead, Acting Commissioner of Patents.
(Seal.)

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[fol. 993]

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2-437

Number (Series of 1900) 460,737 1908 Div. 31 (Ex'r's Book). 149

Patent No. 1020655 1022

Name Frank G. Perkins;
Gertrude S. Perkins, Executrix of estate of said Frank G. Perkins, dec'd. Assor. to Perkins Glue Company, a corp., of Pa.
of South Bend;
County of
State of Indiana.
Invention
Adhesives and Method of Making the Same.

Division of App., No. — filed ——, 190
Reissued July 2, 1912
No. 13436.

Parts of Application filed.

| | Original. | Renewed. |
|---|---|---|
| Petition | November 2, 1908 | ——, 190– |
| Affidavit | " " 1908 | ——, 190– |
| Specification | " " 1908 | ——, 190– |
| Drawing | None , 190– | ——, 190– |
| Model or Specimen | —— , 190– | ——, 190– |
| First Fee Cash $15; | Nov. 2, 1908 | ——, 190– |
| " " Cert. | —— , 190– | ——, 190– |
| Appl. filed complete | Nov. 2, 1908 | ——, 190– |

Examined G. S. Ely, Exr.
Dec. 13, 1911
Countersigned H. B. Burch —— ——,
For Commissioner. For Commissioner.
Notice of Allowance
Dec 22, 1911 ——, 190–
Final Fee Cash $20 Feb. 20, 1912 ——, 190–
" " Cert. , 190- ——, 190–
Patented March 19 ——, 1912
Associate Attorney, Attorney-, Kenyon & Kenyon;
49 Wall St., N. Y. City.
Name —— ——. Serial No. —.
Patent No. —. Date of Patent —— —.
No. 460737 Div. 31.

[fol. 994] 2-057

Memorandum

The first of $15, applied to the application of Frank G. Perkins was included in composite letter No. — received Nov. 2/08, which letter is on file in the Mail Room.

S. M. Pool, Application Clerk.

Mail Room, Nov. 2, 1908, U. S. Patent Office

KIM

Serial No. 460,737

Div. 31

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PETITION

To the Commissioner of Patents:

Your Petitioner, Frank G. Perkins, a citizen of the United States, a resident of and whose Post Office address is 211 North Lafayette Street, South Bend, County of Saint Joseph, State of Indiana, prays that Letters Patent may be granted to him for certain new and useful improvements in adhesives and method of making the same (Case 1) set forth in the annexed specification.

Your petitioner hereby appoints the firm of Kenyon & Kenyon (Registered No. 2570), composed of Wm. Houston Kenyon, Alan D. Kenyon, Robert N. Kenyon and Richard Eyre of 49 Wall Street, New York City, his attorneys, with full power of substitution and revocation, to present and prosecute this application, to make alterations and amendments therein, to sign the drawings, to receive the patent, [fol. 995] and to transact all business in the Patent Office connected therewith.

Signed at New York City, this 24th day of October, 1908.

Frank G. Perkins.

Specification

To all whom it may concern:

Be it known that, I Frank G. Perkins, a citizen of the United States, and a resident of South Bend, County of St. Joseph, and State of Indiana have invented cer-

[*Words and figures enclosed in brackets erased in copy.]

Per D. tain new and useful improvements in glue [adhesives]* and method of making the same of which the following is a specification:

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My invention relates to improvements in adhesives and the method of making the same, and more particularly to the manufacture of adhesives or glue from carbohydrates and especially those containing cellulose.

In the well known method of making a "starch paste" the solid is mixed with water enough, to make, after "cooking up," a paste of such viscosity or density that it can be easily applied. This mixture is then subjected to heat to rupture or burst the cellulose walls and this cooking to a considerable degree reduces the cellulose to soluble starch. To increase the adhesive power small amounts of alkali have been added prior to heating, which, to a slight degree put into suspension or solution a portion of the cellulose, thereby forming a binder or tie in the paste. The progressive action of the alkali, however, greatly increased by heat, and itself increasing the reducing effect of the heat by mutual ac- [fol. 996] tion, very soon injures the adhesive power by its transforming the original valuable cellulose element into soluble starch and finally into sugar. This chemical change causes the paste to lose its Per A. "tack" or tenacity and its tendency to set and dry sets up fermentative destruction. Just in the degree that this chemical change progresses so the value of the adhesive is impaired. The paste in cooling also becomes thick and jelly-like and practically impossible to apply and use when originally made with considerable water, or diluted after cooking. If more water is added in an attempt to make it more fluid the paste becomes so weak and di- Sub [B]* C1 luted that it has practically no power and would be wholly unfit for most classes of work.

Various objects of my invention are to provide a glue and a method of making the same from carbohydrates, which will not have the disadvantages just

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[*Words and figures enclosed in brackets erased in copy.]

pointed out, but which will be exceptionally tenacious and powerful but still amply fluid for easy application, and which can be economically and easily produced.

A further object of my invention is to produce an adhesive which will have the great practical advantage that it may be worked up with the same proportions of water as are now employed in the use of animal glues, thus being usable under the same working or factory conditions hitherto employed for animal glues. As far as I am aware, such conditions have never been met by any prior adhesive made from a carbohydrate base. A further important object of my invention is to produce an adhesive or glue which may be sold in a dry state and which may then be prepared for use by mixing up without the use of heat. Such improvements are of great practical and industrial advan- [fol. 997] tage [s]* and importance and have been much sought.

To do this I first take a carbohydrate of the proper kind and treat it with a reagent to decrease its water absorptive properties so that in order to render fluid the finished glue, comparatively little water will have to be added and the final glue will not thereby become seriously diluted. As a base I prefer to use the carbohydrate secreted by the cassava plant. After being treated as above, the dried material may be mixed with a small amount of water and with a solvent of cellulose, such as caustic alkali and a glue produced which is exceptionally powerful and which is very stable in its physical condition, so much so, that it may be kept for days or even weeks after it has been made into a liquid state without fermentative change. By my process the glue is free from the complications which attend the use of an adhesive which must be cooked or warmed before use, or kept warm during use, and is vastly more powerful than that which results from the treatment of starch by heat, which, only to a limited degree can obtain the benefit of the great tenacity of the cellulose, and is exceedingly liable to "souring" or fermentative changes.

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[*Words and figures enclosed in brackets erased in copy.]

Further objects, advantages and features will more clearly appear from the detail description given below.

In carrying out one embodiment of my invention I take the cassava carbohydrate in dry form and add an equal weight of water. The batch is then agitated and heated to about 130° F. Then I slowly add from 2% to 3% of strong sulphuric acid, the mass being kept in continual agitation. The agitation is continued for from four to six hours after the acid has been added and then the acid may be neutralized by the addition [fol. 998] of a small amount of caustic soda or similar alkali. The batch is then cooled, drained and dried and packed in dry form until ready for use.

The above forms the first part of my improved process and the various steps therein may all be carried out at the factory. In commercial use I preferably ship the dry material, obtained as above, to the consumer who carries out the second part of the process at the place where the glue is to be used, but if desired the first and second parts of my improved process may be carried out together.

In carrying out the remaining steps in the preparation of my improved glue, the dried base, obtained as above, is mixed with from two to three parts, by weight, of water, according to the strength of the joint and economy desired. A liquid suspension is thereby formed which is agitated and treated with a solvent of cellulose, as for example, an aqueous solution of caustic soda or potash, using from six to ten per cent of the weight of the dry base, of dry alkali. The alkali, I believe, acts catalytically to put the cellulose of the carbohydrate into solution, although the solution may be merely colloidal, and in using the term "solution" I consider it broad enough to embrace colloids. The alkali is best added in the form of a solution of from 33% to 50% strength. Sodium and potassium hydrates are the most available and among the most powerful of the known solvents of cellulose and are well adapted for the purposes in question.

As previously stated when ordinary starch is heated with water it is capable of absorbing enormous quantities of water and if mixed with two or three parts

of water becomes of a stiff, jelly-like form which must [fol. 999] be very much diluted before it will be practically workable. I find, however, that by treatment with sulphuric acid or other reagents this water absorbing power can be regulated and greatly reduced and the jelly effect be prevented, although mixed under the same conditions and with the same proportions which, in an untreated starch would produce the previously described unworkable jelly. This I believe is due to the action of the acid upon the granulose in the starch with which the acid so reacts that the granulose will no longer absorb the large amounts of water as before. This substantially reduces the absorption of water by the starch and prevents it from becoming jelly-like and tough when afterward treated with the alkali. The carbohydrate thus changed is dried and may be then put on the market in dry form. In this case the last part of the process would be preferably carried out by the consumer. However, if desired, both parts of the process may be carried out by the manufacturer, or by the consumer, or in any other manner desired.

Per A.

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In the second part of my improved process, only from one to three parts of water by weight to one part of the dry material are used and after adding the solvent it is found that even with such a small amount of water, the batch will assume a fluid consistency and will not become jelly-like and tough as in former processes. The alkali added acts to dissolve more or less of the cellulose, thereby forming an adhesive of very tenacious properties. The dry carbohydrate is mixed with the water without heat, although it may be used but to a slight degree only, if desired. By the preliminary treatment in reducing the water absorbing power of the carbohydrate, a very concentrated [fol. 1000] mixture of the adhesive and water may be obtained.

I believe that the cause of the tenacious properties when carbohydrates are treated with water and a strong solution of an alkali may be traced to the catalytic action of the alkali and that the amount of tenacity produced depends upon the amount of cellulose made

available to act as a bond or tie. Consequently I believe that to obtain the best results it is necessary to abstain from reducing the cellulose to soluble starch, and that sufficient cellulose must be left to make the glue amply tenacious. Therefore, the action of the acid and alkali should not be carried so far nor the temperature be too high as to destroy the cellulose or impair its strength by changing it into soluble starch and the starch into sugar.

In actual practice I have found that the best adhesive is produced by treating the base with the chemicals to reduce the water absorbing power to a point where the base if mixed with from 2 to 3 parts of water and subjected to heat of 170° F. would result in a syrupy condition instead of a thick jelly-like mass as would occur in an untreated base, so tested.

I find that by such suitable treatment under my process it is possible to produce from the base long filaments having superior strength to similar threads of animal glue. The diluted mixtures of pastes hitherto made from the natural carbohydrates in the manner explained before are wholly unfit for most classes of work since they contain so much water that it takes the joints very long to dry and when they do become dry there is so little material left that only a very weak bond is obtained. Thus it is of greatest importance and value to produce a concentrated glue solution [fol. 1001] ready for application, which parallels the animal glue solutions now employed industrially, in respect to water contents as well as strength. Practically all the water must be later removed that goes into the glue solution and is applied to the joints, hence an increase of water in the glue solution involves changes in drying methods, or in drying time, or in risks of injury to the material due to warping by the extra water, all of very serious consequence.

[Insert A1]* My improved glue is transparent and free from odor, and is very stable after mixing for use. Although, in the final glue the cellulose is dissolved in the caustic, the cellulose is still in

[*Words and figures enclosed in brackets erased in copy.]

such a condition that it is insoluble in water. Such a glue will, therefore, produce joints which are practically insoluble in water and which are unaffected by steam or other moisture. These features make my glue especially advantageous for purposes in which other glues are practically useless.

Although I have described my improvements in great detail and with much particularity and have mentioned particular compounds which I prefer to use, I desire it to be understood that I do not limit myself to such details and compounds, as many substitutes may be found, but having fully and clearly described my invention, what I claim and desire to secure by Letters Patent is:

Sub. [B1]* C1

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[Matter enclosed between rules erased in copy.]

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1. In the making of adhesives, the treating of a cellulose compound with a reagent to lessen its water absorptive properties.

Per A.

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1 [2].* The improved process for making adhesives which consists in treating a carbohydrate with a reagent to lessen its water absorptive properties and then treating it with a reagent to increase its adhesive properties.

Sub. [B2]* C1

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[Matter enclosed between rules erased in copy.]

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a

[fol. 1002] 2 [3].* The improved process for making adhesives which consists in treating of a carbohydrate material with an acid to lessen its water absorptive properties.

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[*Words and figures enclosed in brackets erased in copy.]

4. The improved process for making adhesives which consists in treating a cellulose compound with an acid to lessen its water absorptive properties and
Per A. then treating it with a reagent to add to its adhesive properties.

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[Matter enclosed between rules erased in copy.]

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a
2 [5]* The improved process for making adhesives which consists in treating a cellulose material with an acid to decrease its water absorptive properties and then treating it with an alkali to increase
Sub. B2 C1 its adhesive properties.

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[Matter enclosed between rules erased in copy.]

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6. The improved process for making adhesives which consists in treating a carbohydrate with a reagent to lessen its water absorptive properties, and also treating it with an alkali to give it adhesive properties.

7. The improved process for making adhesives which consists in treating a cellulose compound by applying heat thereto, and treating it with a reagent
Per A. to decrease its water absorptive properties and then treating it with a reagent to add to its adhesive properties.

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[Matter enclosed between rules erased in copy.]

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a
3 [8].* The improved process for making adhesives which consists in treating cassava carbohydrate with substantially an equal weight of water, heating the same to about 130° F., adding from 2% to 3% by weight of an acid, slowly, and during agitation, [fol. 1003] neutralizing the batch with an alkali after

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[*Words and figures enclosed in brackets erased in copy.]

from 4 to 6 hours agitation, then cooling and drying the batch, then adding from 2 to 3 parts by weight of water, and then while being agitated treating the same with a solution of a caustic alkali using 6% to 10% by weight of the dry alkali.

a

4 [9].* In the making of adhesives, the treating of cassava carbohydrate with a reagent to lessen its water absorptive property.

a

5 [10].* In the making of adhesives, the treating of cassava starch with a reagent to
Sub. [B2.]* C1 increase its adhesive properties.

5 [10].* In making of adhesives, the treating of cassava starch with a reagent to in-
Sub. [B2.]* C1 crease its adhesive properties.

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[Matter enclosed between rules erased in copy.]

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11. The improved process for making adhesives which consists in treating cassava starch with a reagent to decrease its water absorptive prop-
Per A. erties and then treating it with a reagent to increase its adhesive properties.

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[Matter enclosed between rules erased in copy.]

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6 [12].* The improved process for making adhesives which consists in treating cassava starch with an acid to decrease its water absorptive property and then treating it with an alkali to give it adhesive properties.

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[Matter enclosed between rules erased in copy.]

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7 [13].* The improved process for making adhesives which consists in treating cassava starch with a re-

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[*Words and figures enclosed in brackets erased in copy.]

Sub. [B2.]* C1 agent to decrease its water absorptive property and then treating it with water and a solvent of cellulose to increase its adhesive properties.

[Matter enclosed between rules erased in copy.]

[fol. 1004] 14. In the making of adhesives, the treating of a carborydrate with a reagent to lessen its water absorptive property.

15. In the making of adhesives, the treating of a starch with a solvent of cellulose to give it adhesive properties.

16. In the making of adhesives, the treating of a starch with an acid to change its water absorptive properties.

17. The improved process for making adhesives which consists in treating a starch with a reagent to change its water absorptive properties and then treating it with a reagent to change its adhesive power.

18. The improved process for making adhesives which consists in treating a starch with an acid to decrease its water absorptive properties and then treating it with a base to increase its adhesive power.

19. The improved process for making adhesives which consists in treating a starch-cellulose material with a reagent to change its water absorptive property, and then treating it with a reagent to increase its adhesive power.

20. The improved process for making glue which consists in treating a cellulose material with a reagent to lessen its water absorptive properties and then treating it with a solvent of cellulose to increase its adhesive properties.

[Matter enclosed between rules erased in copy.]
[*Words and figures enclosed in brackets erased in copy.]

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Per A. 8 [21].* The improved process for making adhesives which consists in treating a cellulose material with a reagent to decrease its water absorbing power and also treating it
Sub. [B2.]* C1 with a reagent which acts to put the cellulose into solution.

[Matter enclosed between rules erased in copy.]

[fol. 1005] 22. The improved process for making adhesives which consists in treating a cellulose material with a reagent to lessen its water absorptive property and then treating it with a reagent which acts to put the cellulose into a colloidal solution.

23. In the making of adhesives the treating of carbohydrates with a plurality of reagents to increase their adhesive power.

24. In the making of adhesives the treating of starch with a reagent to increase its adhesive properties.

25. The improved method for producing a base for adhesives which consists in treating a cellulose material with heat and a reagent to change its
Per A. water absorptive properties.

[Matter enclosed between rules erased in copy.]

a
9 [26].* The improved method for producing a base for adhesives which consists in treating cassava starch with heat, water and an acid reagent to change its water absorptive properties and then drying the same.

a
10 [27].* The improved method for producing a base for adhesives which consists in treating a cellulose

[Matter enclosed between rules erased in copy.]
[*Words and figures enclosed in brackets erased in copy.]

starch with heat, water, and a reagent to decrease its water absorptive properties and finally drying the same.

Sub. [B2.]* Cl

[Matter enclosed between rules erased in original transcript.]

Per A. 28. The improved process for making adhesives which consists in taking a basic starch material which has had its water absorptive properties changed, and treating it with a solvent of cellulose to increase its adhesive properties.

29. The improved process for making adhesives which consists in taking a basic starch cellulose material which has had its water absorptive properties [fol. 1006] decreased and treating it with a reagent to better its adhesive properties.

[Matter enclosed between rules erased in copy.]

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11 [30].* The improved process for making adhesives which consists in taking a proper dry starch cellulose material and forming an adhesive glue with less than seven parts of water by weight to one of the dry material.

a

12 [31].* The improved process for making adhesives which consists in taking a [proper]* dry starch cellulose material and forming an adhesive glue therefrom, by mixing with it less than three parts of water by weight and a solution of a solvent of cellulose.

Per B.

[Matter enclosed between rules erased in copy.]

32. The improved glue which consists of a cellulose compound which has been treated with a reagent so that its water absorptive properties are decreased and which has been made more tenacious by treatment with a solution which acts to dissolve the cellulose.

Per A.

[Matter enclosed between rules erased in copy.]
[*Words and figures enclosed in brackets erased in copy.]

a

13 [33].* The improved glue base which consists of a dry cellulose material capable of being changed into a flowing solution by the addition of from two to three parts by weight of water.

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Per B. 14 [34].* The improved glue base which consists of a dry starch-cellulose material so treated that its water absorptive properties are decreased so that it is capable of being converted into a flowing glue by the addition of from two to three parts of water.

[Matter enclosed between rules erased in copy.]

[fol. 1007] 35. The improved glue product which consists in the combination of an acid treated
Per A. cellulose material, water, and an alkali solution.

[Matter enclosed between rules erased in copy.]

a

15 [36].* An adhesive containing a carbohydrate with its natural water absorbing power altered and containing dissolved cellulose which is substantially insoluble in water.

[Matter enclosed between rules erased in copy.]

37. An adhesive containing dissolved cellulose substantially insoluble in water.

38. An adhesive embracing a carbohydrate with its natural water absorbing power decreased and containing cellulose in a form substantially insoluble in water.

39. An adhesive embracing a carbohydrate with its natural water absorbing properties changed and containing matter substantially insoluble in water.

[*Words and figures enclosed in brackets erased in copy.]

40. A fluent adhesive containing a carbohydrate and less than seven parts by weight of water to one of carbohydrate, said glue also containing matter insoluble in water.

41. A fluent glue embracing a cellulose carbohydrate and less than seven parts by weight of water to one of carbohydrate.

Per A.

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[Matter enclosed between rules erased in copy.]

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Per B. a 16 [42].* A fluent adhesive embracing a carbohydrate and less than seven parts by weight of water to one of carbohydrate, said carbohydrate embracing cellulose in a form substantially insoluble in water.

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[Matter enclosed between rules erased in copy.]

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43. A fluent glue composed of a carbohydrate and less than seven parts by weight of water to one of carbohydrate.

[fol. 1008] 44. A cold fluent glue composed of a carbohydrate and water.

45. A cold fluent adhesive composed of a cellulose carbohydrate and water.

46. A glue which is fluent when cold, composed of a carbohydrate which contains matter insoluble in water.

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[Matter enclosed between rules erased in copy.]

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a 17 [47].* An adhesive which is fluent when cold, composed of a carbohydrate and which contains cellulose in a form substantially insoluble in water.

a 18 [48].* An adhesive which is fluent when cold, composed of a carbohydrate and less than six parts by weight of water to one part of carbohydrate.

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[*Words and figures enclosed in brackets erased in copy.]

a

19 [49].* A glue which is fluent when cold, composed of a carbohydrate and less than six parts by weight of water to one part of carbohydrate and which also contains dissolved cellulose which is insolu-
Per B. ble in water.

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[Matter enclosed between rules erased in copy.]

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50. An adhesive which is fluent when cold, composed of a cellulose carbohydrate material and a catalytic reagent.

Per A. 51. A cold fluent glue containing cellulose.

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[Matter enclosed between rules erased in copy.]

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a

Per B. 20 [52].* A glue mixture consisting of 1 to 3½ parts of water by weight, 1 part of a carbohydrate containing starch cellulose substantially insoluble in cold water, and a solvent of cellulose.

a

[Insert A2.]* 25 [53].* A glue mixture consist-
[Sub. B2.]* ing of 1 to 3½ parts of water by
Per C. weight, 1 part of carbohydrate containing starch cellulose dissolved by a catalytic reagent.

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[Matter enclosed between rules erased in copy.]

[fol. 1009] In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

Frank G. Perkins.

Witnesses: 1. Gorham Crosby. 2. Edwin Seger.

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[*Words and figures enclosed in brackets erased in copy.]

## Oath

STATE OF NEW YORK,
County of New York, ss:

Frank G. Perkins, the above-named petitioner being duly sworn, deposes and says that he verily believes himself to be the original first and sole inventor of the certain new and useful improvements in adhesives and method of making the same described and claimed in the annexed specification; that he does not know and does not believe that the same was ever known or used before his invention or discovery thereof, or that the said invention was ever patented or described in any printed publication in this or any foreign country before his invention or discovery thereof; that no application for a foreign patent for the said invention has been filed or caused to be filed by him or his legal representatives or assigns in any foreign country; that the said invention has not to his knowledge and belief, been in public use or on sale in the United States, or patented or described in a printed publication or patent, more than two years prior to this application, and that he is a citizen of the United States and a resident of South Bend, County of Saint Joseph, State of Indiana.

Frank G. Perkins.

Subscribed and sworn to before me this 24th day of October, 1908. Edwin Seger, Notary Public for Kings County. Certificate filed in New York County. (Seal.)

[fol. 1010] 2—260

Div. 31, Room 169

Paper No. 1

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

66—285

Department of the Interior,
United States Patent Office,
MDE. Washington, D .C., Dec. 12, 1908.
Mailed " " "

Frank G. Perkins,
c/o Kenyon & Kenyon, 49 Wall Street, New York, N. Y.:

Please find below a communication from the Examiner in charge of [the your]* application [of]* No. 460,737, Adhesives and Method of Making the Same, filed November 2, 1908. E. B. Moore, Commissioner of Patents.

"The" should be inserted before "same," in line 23, page 5.

It is thought that there is no ground for explaining the action of the alkali on cellulose as catalysis. Claims based thereon are untenable.

Attention is called to the British patent to Herzberg, 12,326 of 1897, which practically meets applicant's process.

Attention is further directed to Higgins, 546,401, September 17, 1895, Higgins, 642,329, January 30, 1900, Robeson, 833,634, October 16, 1906.

All the above patents are found in class 87-17.

The claims however are all rejected on the ground that they do not conform to the statutory requirement as to conciseness. See ex parte Chapman, 120 O. G. 2446.

WNH. Ely, Examiner.

[fol. 1011] Mail Room, Nov. 30, 1909, U. S. Patent Office

U. S. Patent Office, Received Dec. 1, 1909

Serial No. 460,737. A

Division 31, Paper No. 3 2

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460[473]*737. Filed Nov. 2, 1908. For Adhesives and Methods of Making the Same

49 Wall Street,
New York City, November 24, 1909.

Hon. Commissioner of Patents, Washington, D. C.

Sir: In response to the official action of December 12, 1908, please amend the above entitled application as follows:

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[*Words and figures enclosed in brackets erased in copy.]

Page 2, line 21; change "sits" to "sets."
Page 5, line 7; correct the spelling of "cellulose."
Same page, line 10; correct the spelling of "colloids."
Same page, line 23; after "with" insert "the."
Page 7, next to the last line, after "use" insert

Per B1

A1. the following: "and has substantially all the physical qualities and characteristics of the best animal glue."

[Matter enclosed between rules erased in copy.]

Cancel claims 1, 3, 4, 6, 7, 11, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 28, 29, 32, 35, 37, 38, 39, 40, 41, 43, 44, 45, 46, 50 and 51 and adjust the ordinals of the remaining claims.

Insert the following Claims:

[Cls. 21 24]*

[fol. 1012] Sub. B2

A 2. 21. The improved process for making glue which consists in treating a starch with a reagent to lessen its water absorptive properties and then treating it with an alkaline solution to produce a glue which has substantially the same characteristics as the best animal glue.

22. The improved glue which consists of a starch base treated with a reagent to lessen its water absorptive properties and then dried and treated with an alkaline solution to form a glue, having substantially the same characteristics as the best animal glue.

23. The improved glue which consists of a starch base treated with an acid reagent to lessen its water absorptive property, then treated with a reagent to neutralize the free acid, then dried and treated with

[*Words and figures enclosed in brackets erased in copy.]

an alkaline solution to form a glue, having substantially the same characteristics as the best animal glue.

24. The improved glue which consists of a starch base treated with a reagent to lessen its water absorptive property, and with an alkaline Cl agent to for a glue which is fluent when cold and when it contains less than six parts by weight of water to one part of starch.

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[Matter enclosed between rules erased in copy.]

Remarks

Many of the claims have been cancelled in order to comply with the examiner's requirements as to conciseness. Amendments have also been made to obviate the examiner's criticism in other respects.

The references cited by the examiner have been considered, but it is believed that they fail to show a process which will produce applicant's product. The product de- [fol. 1013] scribed in the references is a white unctuous paste, having none of the characteristics of animal glue. Applicant's process produces a product which has a light brown color and [floats]* flows like a liquid and has substantially all the characteristics of the best animal glue.

In view of the above, a re-consideration and favorable action on the merits is respectfully solicited.

Respectfully submitted.

Kenyon & Kenyon, Attorneys for Applicant.

[fol. 1014] 2—260

Div. 31, Room 169

Paper No. 3

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

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[*Words and figures enclosed in brackets erased in copy.]

Department of the Interior,
United States Patent Office,
MDE. Washington D. C., Dec. 16, 1909.
Mailed " " "

Frank G. Perkins, c/o Kenyon & Kenyon, 49 Wall Street, New York, N. Y.:

Please find below a communication from the Examiner in charge of [the]* your application [of]* No. 460,737, Adhesives and Method of Making the Same, filed November 2, 1908.

E. B. Moore, Commissioner of Patents.

This case has been reconsidered in view of the amendment of November 30, 1909.

Claims 22-24 are objectionable since they define the product by the process of making.

The former objection relating to the explanation of the action of the alkali on the cellulose as catalysis is repeated. Claim 25, based thereon, is rejected.

The British patent to Herzberg, of record, substantially anticipates applicant's process except the intermediate step of drying which is recited in certain claims. This step of drying if performed by the manufacturer is not seen to be of utility and if performed by the consumer does not confer patentability on the process. No true process is defined by [fol. 1015] reciting certain steps which are to be carried out by the manufacturer in his plant and certain other steps that are to be executed by the consumer before using the article. In view of the above all the claims, except claim 3, are rejected on Herzberg.

Claims 4, 5 and 9-20 are rejected on the British patent to Ekman, 8331 of 1901 (87-17).

Claims 11-14 are rejected on Higgins, 642,329, of record.

The British patent to Steiger, 8029 of 1890 (87-7, Vegetable), meets claims 4, 5, 9, 10 and 17.

Claim 3 may be allowed.

Ely, Examiner.

W. N. H.

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[*Words and figures enclosed in brackets erased in copy.]

Mail Room, Aug. 15, 1910, U. S. Patent Office

Received Aug. 16, 1910

460,737

Division 31, Paper No. 4

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460,737. Filed November 2, 1908. For Adhesives and Methods of Making the Same

49 Wall Street, New York City, July 29, 1910.

Hon. Commisioner of Patents, Washington, D. C.

SIR: In response to the official action of December 16, 1909, please amend the above entitled application as follows:

Cancel pages 2, 3, 4, 5, 6, 7 and 8, and substitute the following:

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[fol. 1016] My invention relates to improvements in adhesives and the method of making the same, and more particularly to the manufacture of adhesives or glue from carbohydrates and especially those containing cellulose.

In the well known method of making a "starch paste" the solid is mixed with water enough, to make, after "cooking up," a paste of such viscosity or density that it can be easily applied. This mixture is then subjected to heat to rupture or burst the cellulose walls and this cooking to a considerable degree reduces the cellulose to soluble B[1]. starch. To increase the adhesive power small amounts of alkali have been added prior to heating, which, to a slight degree put into suspension or solution a portion of the cellulose, thereby forming a binder or tie in the paste. The progressive action of the alkali, however, greatly increased by heat, and itself increasing the reducing effect of the heat by mutual action, very soon injures the adhesive power by its transforming the original valuable cellulose element into soluble starch and finally into sugar.

This chemical change causes the paste to loose its "tack" or tenacity and its tendency to set and dry and sets up fermentative destruction. Just in the degree that this chemical change progresses so the value of the adhesive is impaired. The paste in cooling also becomes thick and jelly-like and practically impossible to apply and use when originally made with considerable water, or diluted after cooking. If more water is added in an attempt to make it more fluid the paste becomes so weak and diluted that it has practically no power and would be wholly unfit for most classes of work.

Sub C[1].

Various objects of my invention are to provide a glue and a method of making the same from carbohydrates, [fol. 1017] which will not have the disadvantages just pointed out, but which will be exceptionally tenacious and powerful, but still amply fluid for easy application, and which can be economically and easily produced.

A further object of my invention is to produce an adhesive which will have the great practical advantage that it may be worked up with the same proportions of water as are now employed in the use of animal glue, thus being usable under the same working or factory conditions hitherto employed for animal glues. As far as I am aware, such conditions have never been met by any prior adhesive made from a carbohydrate base. A further important object of my invention is to produce an adhesive or glue which may be sold in a dry state and which may then be prepared for use by mixing up with or without the use of heat. Such improvements are of great practical and industrial advantage and importance and have been much sought.

To do this I first take a carbohydrate of the proper kind, and treat it with a reagent to decrease its water absorptive properties so that in order to render fluid the finished glue, comparatively little water will have to be added and the final glue will not thereby become seriously diluted. As a base I prefer to use the carbohydrate secreted by the cassava plant. After being treated as above, the dried material may be mixed with a small amount of water and with a caustic alkali and a glue produced which is exceptionally powerful and which is very stable in its physical condition, so much so, that it may be kept for days or even weeks after it has been made into a liquid state without *d*ermentative

change. By my process the glue is free from the complica-
[fol. 1018] tions which attend the use of an adhesive which must be cooked or warmed before use, or kept warm during use, and is vastly more powerful than that which results from the treatment of starch by heat, which only to a limited degree can obtain the benefit of the great tenacity of the cellulose, and is exceedingly liable to "souring" or fermentative changes.

Further objects, advantages and features will more clearly appear from the detail description given below.

In carrying out one embodiment of my invention I take the cassava carbohydrate or flour in dry form and add an equal weight of water. The batch is then agitated and heated to about 130° F. Then I slowly add from 2% to 3% of strong sulphuric acid, the mass being kept in continual agitation. The agitation is continued for from four to six hours after the acid has been added and then the acid may be neutralized by the addition of a small amount of caustic soda or similar alkali. The acid acts upon the starch or carbohydrate to decrease its water absorptive properties and this action is aided by the heat. However, great care must be exercised to not have the heat sufficient nor the amount of acid great enough to put the starch or carbohydrate in solution. If the action of the acid and heat is carried too far the starch will be changed into dextrine or soluble starch and go into solution and as such it could not be made to have practically any of the advantages of my product. I find that if the mixture is boiled or if much more than 3% of acid or much more than 130° F. of temperature is used more or less of the carbohydrate will go into solution. Once c[illegible]nged into dextrine the batch would come out more like lard and would be what is known as
[fol. 1019] "short" and would have practically no tenacity as compared with my improved product. This is one important difference between my improved process and product and products hitherto made from starch and known as pastes and mucilage.

That the starch in my improved process does not go into solution under the action of the acid is shown by its settling upon stopping the agitation. Sulphuric and other acids are known to have considerable power as oxidizing agents and I believe that it is by such an action that the acid acts

upon the granulose in the starch to decrease its water absorptive properties. The amount of alkali used is only enough to neutralize the acid. After this has been added the batch is then cooled, drained and dried and packed in dry form until ready for use.

I find that the carbohydrate secreted by the cassava plant and known as cassava flour has many advantages over other starches or starchy products and prefer its use. Other starchy products from the cassava plant are found to be more or less adaptable and even other starchy products may be used with some little success but they do not produce glues so tenacious and are otherwise more or less undesirable. Some are effected by impurities. Potato starch and some others are found to produce a product having more or less the consistency of lard and are termed "short" and are lacking in tenacity.

The above forms the first part of my improved process and the various steps therein may all be carried out at the factory. In commercial use I preferably ship the dry material, obtained as above, to the consumer, who carries out the second part of the process at the place where the glue is to be used, but if desired the first and second parts of my improved process may be carried out together.

[fol. 1020] In carrying out the remaining steps in the preparation of my improved glue, the dried base, obtained as above, is mixed with from two to three parts, by weight, of water, according to the strength of the joint and economy desired. A liquid suspension is thereby formed which is agitated and treated at about 170° F. with a solvent of cellulose, as for example, an aqueous solution of caustic soda or potash, using from six to ten per cent of the weight of the dry base, of dry alkali. The alkali acts upon the starch to change its properties so that it has those of the animal glue. In doing this it does what is known as "bursting" the starch and, I believe, it acts catalytically to put the cellulose of the carbohydrate into solution, although the solution may be merely colloidal, and in using the term "solution" I consider it broad enough to embrace celloids. The alkali is best added in the form of a solution of from 33% to 50% strength. Sodium and potassium hydrates are the most available and among the most powerful of the

known solvents of cellulose and are well adapted for the purposes in question.

As previously stated when ordinary starch is heated with water it is capable of absorbing enormous quantities of water and if mixed with two or three parts of water becomes of a stiff jelly-like form which must be very much diluted before it will be practically workable. I find, however, that by treatment with sulphuric acid or other reagents without dissolving this water absorbing power can be regulated and greatly reduced and the jelly effect be prevented, although mixed under the same conditions and with the same proportions which in an untreated starch would produce the previously described unworkable jelly. This I [fol. 1021] believe is due to the action of the acid upon the granulose in the starch with which the acid so reacts that the granulose will no longer absorb the large amounts of water as before. This substantially reduces the absorption of water by the starch and prevents it from becoming jelly-like and tough when afterward treated with the alkali. The carbohydrate thus changed is dried and may be then put on the market in dry form. In this case the last part of the process would be preferably carried out by the consumer. However, if desired, both parts of the process may be carried out by the manufacturer, or by the consumer, or in any other manner desired.

In the second part of my improved process, only from one to three parts of water by weight to one part of the dry material are used and after adding the solvent it is found that even with such a small amount of water, the batch will assume a fluid consistency and will not become jelly-like and tough as in former processes. The alkali added acts to dissolve more or less of the cellulose, thereby forming an adhesive of very tenacious properties. The dry carbohydrate is mixed with the water without heat, although it may be used but to a slight degree only, if desired. By the preliminary treatment in reducing the water absorbing power of the carbohydrate, a very concentrated mixture of the adhesive and water may be obtained.

I believe that the cause of the tenacious properties when carbohydrates are treated with water and a strong solution of an alkali may be traced to the catalytic action of the

alkali and that the amount of tenacity produced depends upon the amount of cellulose made available to act as a bond or tie. Consequently I believe that to obtain the best [fol. 1022] results it is necessary to abstain from reducing the cellulose to soluble starch or dextrine, and that sufficient cellulose must be left to make the glue amply tenacious. Therefore, the action of the acid and alkali should not be carried so far nor the temperature too high as to destroy the cellulose or impair its strength by changing it into soluble starch and the starch into sugar or dextrine.

In actual practice I have found that the best adhesive is produced by treating the base with the chemicals to reduce the water absorbing power to a point where the base if mixed with from 2 to 3 parts of water and subjected to heat of 170° F. would result in a syrupy condition instead of a thick jelly-like mass as would occur in an untreated base, so tested.

I find that by such suitable treatment under my process it is possible to produce from the base long filaments having superior strength to similar threads of animal glue. The diluted mixtures of pastes hitherto made from the natural carbohydrates in the manner explained before are wholly unfit for most classes of work since they contain so much water that it takes the joints very long to dry and when they do become dry there is so little material left that only a very weak bond is obtained. Thus it is of greatest importance and value to produce a concentrated glue solution ready for application, which parallels the animal glue solutions now employed industrially, in respect to water contents as well as strength. Practically all the water must be later removed that goes into the glue solution and is applied to the joints, hence an increase of water in the glue solution involves changes in drying methods or in drying time, or in risks of injury to the material due to warping by the extra water, all of very serious consequence.

[fol. 1023] My improved glue is transparent and free from odor, and is very stable after mixing for use and has substantially all the physical qualities and characteristics of the best animal glue. Although, in the final glue the cellulose is dissolved in the caustic, the cellulose is still in such a condition that it is insoluble in water. Such a glue will, therefore, produce joints which are practically

insoluble in water and which are unaffected by steam or other moisture. These features make my glue especially advantageous for purposes in which other glues are practically useless.

Although I have described my improvements in great detail and with much particularly and have mentioned particular compounds which I prefer to use, I desire it to be understood that I do not limit myself to such details and compounds, as many substitutes may be found, but having fully and clearly described my invention, what I claim and desire to secure by Letters Patent, is:

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[Matter enclosed between rules erased in copy.]

Rewrite claims as follows:

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1. The improved process for making adhesives which consists in treating cassava carbohydrate with substantially an equal weight of water, heating the same to about 130° F., adding from 2% to 3% by weight of an acid, slowly, and during agitation, neutralizing the batch with an alkali after from 4 to 6 hours agitation, then cooling and drying the batch, then adding from 2 to 3 parts by weight of water, and then while being agitated treating the same with a solution of a caustic alkali using 6% to 10% by weight of the dry alkali.

2. In the making of adhesives, treating cassava flour with substantially an equal weight of water, heating the [fol. 1024] same to about 130° F. and adding from 2% to 3% by weight of strong sulphuric acid slowly and with agitation, without rendering the flour soluble in water, then neutralizing the acid with an alkali after from 4 to 6 hours agitation, then cooling and drying the batch, then adding from 2 to 3 parts by weight of water and then while being agitated treating the same with a solution of caustic alkali using 6% to 10% by weight of the dry alkali.

B 2.

3. In the making of adhesives, treating cassava starch with a suitable amount of water, heating the same and adding sulphuric acid to decrease its water absorptive

properties of the starch but without rendering the starch materially soluble in water, then neutralizing the acid and drying the batch, then treating the dried material with water and caustic alkali to form a glue.

4. In the making of adhesives, treating cassava flour with substantially an equal weight of water, heating the same to about 130° F. and adding from 2% to 3% by weight of strong sulphuric acid slowly and with agitation, without rendering the flour soluble in water, then neutralizing the acid with an alkali after from 4 to 6 hours agitation.

5. In the making of adhesives treating cassava starch with a suitable amount of water, heating the same and adding sulphuric acid to decrease its water absorptive properties of the starch but without rendering the starch materially soluble in water, then neutralizing the acid.

6. In the making of adhesives, treating a starchy material insoluble in water with substantially an equal weight of water, heating the same to about 130° F. and adding from 2% to 3% by weight of a strong acid without rendering the flour materially soluble in water, then neutralizing the acid, then cooling and drying the batch [fol. 1025] and adding from 2 to 3 parts by weight of water and treating the same with a solvent of cellulose to burst the starch.

7. In the making of adhesives, treating a starchy material insoluble in water with substantially and equal weight of water, heating the same to about 130° F. and adding from 2% to 3% by weight of a strong acid without rendering the flour materially soluble in water then neutralizing the acid.

8. In the making of adhesives, treating a suitable carbohydrate insoluble in water with water and an acid to decrease its water absorptive properties but without rendering the carbohydrate materially soluble in water, then neutralizing the acid and allowing the batch to dry, then treating the same with water and a solvent of cellulose such as caustic alkali.

9. In the making of adhesives, treating a suitable carbohydrate insoluble in water with water and an acid to de-

crease its water absorptive properties but without rendering the carbohydrate materially soluble in water, then neutralizing the acid.

10. In the making of adhesives, treating a suitable starchy product with water and an acid to decrease its water absorptive properties but without rendering the starch materially soluble in water, then neutralizing the acid and treating the same with a solvent of cellulose to form a glue having substantially the properties of animal glue.

11. In the making of adhesives, treating a carbohydrate insoluble in water with water and a reagent to decrease its water absorptive properties without rendering it materially soluble in water.

12. In the making of adhesives, treating a carbohydrate insoluble in water with water and a reagent to decrease [fol. 1026] its water absorptive properties without rendering it materially soluble in water, then treating the batch with a solvent of cellulose to form a glue having substantially the properties of a good animal glue.

13. In the making of adhesives, treating a carbohydrate insoluble in water with water and an acid to decrease its water absorptive properties without rendering it materially soluble in water.

14. In the making of adhesives, treating a suitable starchy product with water and a reagent to decrease its water absorptive properties but without rendering the starch materially soluble in water, then neutralizing the reagent and treating the same with a solvent of cellulose to form a glue having substantially the properties of animal glue.

15. In the making of adhesives, treating cassava flour with an acid to decrease its water absorptive properties without rendering it materially soluble in water.

16. In the making of adhesives, treating cassava flour with a reagent to decrease its water absorptive properties without rendering it materially soluble in water.

17. In the making of adhesives, treating a carbohydrate insoluble in water with water and a reagent to decrease

its water absorptive properties without rendering it materially soluble in water, then treating the same with a base to increase its adhesive properties.

18. In the making of adhesives, treating a suitable starchy product with water and an acid to decrease its water absorptive properties but without rendering the starch materially soluble in water, then treating the same with a reagent to increase its adhesive properties.

19. In the making of adhesives, treating a suitable car- [fol. 1027] bohydrate with a reagent to increase its adhesive properties without rendering it soluble in water, to produce a glue having substantially the properties of animal glue.

20. In the making of adhesives, treating a suitable starchy product insoluble in water with a solvent of cellulose to burst the starch without rendering it soluble in water, to produce a glue having substantially the properties of an animal glue.

21. In the making of adhesives, treating a suitable starchy product insoluble in water with a caustic alkali and heat to burst the starch without rendering it soluble in water, to produce a glue having substantially the properties of an animal glue.

22. In the making of adhesives, treating cassava carbohydrate insoluble in water with a solvent of cellulose to burst the starch without rendering it soluble in water, to produce a glue having substantially the properties of an animal glue.

23. In the making of adhesives, treating a suitable starchy product insoluble in water with a base and heat at about 170° F. to burst the starch without rendering it soluble in water.

24. In the making of adhesives, treating a suitable starchy product with from 2 to 3 parts by weight of water and adding a solution of a caustic alkali using 6% to 10% by weight of the alkali to burst the starch without rendering it soluble in water, to produce a glue having substantially the properties of an animal glue.

25. A glue having a carbohydrate base, substantially insoluble in water and having substantially the properties of an animal glue.

26. A glue containing a starchy product as a base and its cellulose, and a solvent of cellulose, the starch being in a form insoluble in water.

[fol. 1028] 27. A glue containing starch as a base and a caustic alkali, the glue being insoluble in water and having substantially the properties of an animal glue.

28. A glue containing cassava carbohydrate as a base and a caustic alkali, the glue being insoluble in water and having substantially the properties of an animal glue.

29. In the making of adhesives, the treating of a carbohydrate with acid to lessen its water absorptive properties and then with a reagent to increase its adhesive properties.

30. In the making of adhesives, the treating of cassava below 130° F. with 200% to 300% by weight of an acid neutralizing the acid and treating the starch with caustic using 60% to 100% of dry alkali.

31. The treating of starch with less than 10% by weight of strong acid and then treating it with a reagent to increase its adhesive proportions.

32. The improved glue base which consists of a dry starchy material insoluble in water and capable of being changed with a flowing solution by the addition of from 2 to 3 parts by weight of water containing a solvent of cellulose.

33. The improved adhesive which consists of dissolved starch substantially insoluble in water.

34. The improved glue which consists of starchy material insoluble in water and a solvent of cellulose.

35. The improved glue which consists of cassava flour insoluble in water and caustic alkali.

36. An adhesive which is fluent when cold composed of starchy matter insoluble in water, a solvent of cellulose and less than 7 parts by weight of water.

[fol. 1029] 37. In the making of adhesives, treating a suitable carbohydrate with an oxidizing agent and water without rendering the carbohydrate materially soluble in water, to decrease the water absorptive properties of the carbohydrate.

38. In the making of adhesives, treating a suitable carbohydrate with an oxidizing agent and water without rendering the carbohydrate materially soluble in water, to decrease the water absorptive properties of the carbohydrate and then treating the carbohydrate with a solvent of cellulose to increase its adhesive properties without rendering it soluble in water.

39. In the making of adhesives, treating a starchy product substantially insoluble in water with an oxidizing agent and water to decrease its water absorptive properties without rendering it soluble in water, and also treating it with an alkali to increase its adhesive properties without rendering it soluble in water.

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[Matter enclosed between rules erased in copy.]

## Remarks

The specification has been rewritten in order to avoid confusion in the amendments and to bring all the parts of the case in proper relation. It will be found, however, that the new specification is largely a copy from the old. Applicant has now finished a large number of experiments with his process and product, and has more carefully considered the various references cited by the Examiner and finds that his invention is not found in any of them. Applicant finds by experiment that if the starch which at the beginning is insoluble in water, is treated in any way so that it is changed into dextrine or soluble starch, or so that it becomes soluble in water, an entirely different product is produced which does not have the tenacity or qualities of ap-
[fol. 1030] plicant's improved product. Applicant has shown that his starch does not become soluble upon treatment by the first step because it settles to the bottom as insoluble matter. Applicant has found that if the heat be

too high or the acid too strong or the process continued for too long a time that the starch may be rendered soluble and if this is done the resulting product is entirely different from applicant's, and in fact is not suitable for the purposes for which applicant's product is designed. The caustic added in the first step of applicant's process is not added in sufficient quantities to cause the starch or cellulose to go into solution but merely in such quantities as is sufficient to neutralize the acid. In the second step of the process a starch or cellulose is put into the solution by the caustic but it is not thereby rendered soluble in water as dextrine or soluble starch would be.

On further consideration of the various references it is found that all of them specify the treatment of starch to render it soluble in water, such as; dextrine, soluble starch or the like. Applicant has therefore rewritten the claims to carefully distinguish his invention from the references cited by specifying that the process should not be carried so far or with enough heat or acid to render the insoluble starch soluble in water and specifying that the resulting product is substantially insoluble in water.

We will now take up the various patents cited by the Examiner.

The British patent, No. 8029 of 1890 to Steiger, describes the boiling of glutinous substances with a suitable acid. Applicant has found by experiment that if starch is thus boiled with an acid it will become soluble and be dissolved. Fur- [fol. 1031] thermore, we may state that he uses glutinous substances and that there is substantially no gluten in cassava flour and that gluten in applicant's process is undesirable since it sets up fermentation which breaks the body of the starch down. Furthermore it will appear that the starch as used in this patent is undesirable since it specifies that it shall be washed out. This patent merely describes one of the many processes for making mucilage or paste as distinguished from glue. In the making of mucilage or paste from starchy products it is this has been done by rendering the same soluble. Applicant does not do this.

British patent, No. 8331 of 1901 to Ekman describes a similar process and specifies that the starch is put into solution by the acid. This changes the starch into dextrine or

soluble starch which applicant does not do as specified in his claims.

The British patent, No. 12,326 of 1897 to Herzberg also describes a similar process and clearly specifies that the starch is placed into acidulated water when it is perfectly dissolved. After this action only enough caustic is added to neutralize the acid. In this connection it is noted that potato starch which this patent specifies does not have the advantages of cassava since potato shows the tendency to become lardy or "short," that is it will not string out and has little tenacity. This patent similarly describes another of the well known methods of changing starch into dextrine or soluble starch to make mucilage. The product, however, will not begin to have the tenacity or qualities of good animal glue which applicant's product does have.

The British patent, No. 22,685 of 1891 to Higgins describes a more complex process and product but which is [fol. 1032] nevertheless of the same nature. It starts off by specifying that the water is brought to a boiling point and this in itself is a material difference from applicant's process since boiling would render the starch soluble. Moreover it specifies the use of dextrine which is in itself soluble and therefore the starchy material is not only soluble to begin with but the resultant product is also soluble in water.

The United States patent to Robeson relates to the process of treating waste sulfite liquors. It does not specify the treatment of starch without rendering it soluble to produce an adhesive as claimed by applicant.

The United States Patent to Higgins, No. 642,329, also falls in line with the above. It specifies that the starch be digested in hot water and impregnated with acid and this digestion continued until the starch is converted into dextrine. This is further than applicant goes because applicant does not want to convert the starch into dextrine as it would thus be rendered soluble. Moreover, the resulting product of the patent is a dextrine paste of white color while applicant's product is materially distinguished therefrom by having the properties of animal glue and being of a darker or amber color. The temperature used by Higgins is too high. A high temperature alone would dissolve the starch which applicant does not desire to do.

The United States patent to Higgins No. 546,401 is observed in a similar manner. This also specifies the use of white dextrine which is soluble in water. On page 2, lines 7 and 8, it is specified that the white dextrine is dissolved in warm water. By putting the dextrine or starch in a solution it is rendered useless for applicant's process and product.

[fol. 1033] From a consideration of the above it will appear that applicant's treatment is broadly new. No one seems to have ever before produced a glue from starch without rendering the starch soluble in water. By doing this applicant renders the resulting product more tenacious and also obtains a product which is insoluble in water and therefore adapted to be used in wet places. Applicant's process and product is not to be compared with those heretofore known and which are designed to make mucilage or paste which is soluble in water, from starch by rendering the starch soluble in water. Furthermore applicant seems to be the first to conceive that a glue having the qualities of good animal glue could be produced by treating the starchy product insoluble in water with an alkali or equivalent, to burst the starch and render it extremely adhesive. While it is old to treat soluble starches and dextrine with caustic in the manufacture of adhesives, applicant is the first to conceive that an insoluble starch may be treated with caustic to obtain a product entirely different from that otherwise obtained which is more tenacious and has the properties of animal glue as distinguished from those of the ordinary mucilage and white unctuous paste.

We do not fully understand the Examiner's statement "that this step of drying if performed by the manufacturer is not seen to be of utility and if performed by the consumer does not confer patentability on the process. No true process is defined by reciting certain steps which are to be carried out by the manufacturer in his plant and certain other steps that are to be executed by the consumer before using the article." It would seem to us that this step of drying is a most important and useful one since it allows the [fol. 1034] product to be put into a shape into which it can be conveniently shipped. Furthermore, whether or not the steps are carried out one immediately after the other at the

same place or at different places after the elapse of time, it does not seem that this can in any way detract from the utility or novelty of the process. We know of no decision so holding.

Former claim 2 which was allowed has been rewritten as claim 1.

We believe we have clearly pointed out that each of the new claims is clearly patentable over the references cited and in view of the above a reconsideration and favorable action upon the case is earnestly solicited.

Respectfully submitted.
Kenyon & Kenyon, Attorneys for Applicant.

[fol. 1035] 2—260

Div. 31, Room 169

Paper No. 5

Address only "The Commissioner of Patents, Washington, D. C.," and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

Department of the Interior,
United States Patent Office,
Washington, Sep. 20, 1910.
Mailed " " "

Frank G. Perkins, Care Kenyon & Kenyon, 49 Wall St., New York, N. Y.:

Please find below a communication from the Examiner in charge of the your application, of No. 460737, Adhesives and Method of Making the same, filed Nov. 2, 1908.

E. B. Moore, Commissioner of Patents.

This case has been reconsidered in view of the amendment of August 15, 1910.

The following errors were noted in the substitute specification: Page 4, line 1, the third word should be fermentative. On page 6, line 3 from the bottom, the expression "without dissolving" should be cancelled. Page 4, line 20,

the comma before "absorptive" should be cancelled. In claim 30, the percentages of acid and alkali are incorrectly stated.

When starch is treated with a small percentage of acid the granulose is dissolved out, leaving the amylo-cellulose intact, and treatment with water changes part of the starch cellulose into soluble starch leaving a part which obstinately [fol. 1036] resists the action of water and is readily dissolved by dilute alkali. The above statement condensed from Allen's Commercial Organic Analysis, Vol. 1, London, J. & A. Churchill, 7 Great Marlborough St. N., 1898, page 405, paragraph, Structure of Starch Corpuscles, discloses that starch is hydrolyzed by the action of small quantities of acid but gives no basis for the statement found in the specification, and claims that small quantities of acid decrease the water absorptive properties of cassava or similar carbohydrates. Further, the specification furnishes no evidence that the applicants' process has decreased the water absorptive properties of the carbohydrate used. Neither does the specification supply conclusive evidence that the granulose, and therefore the starch, has not gone into solution. Since the settling upon stopping the agitation," referred to on page 5, line 8, of the specification, presumably arises either from the sedimentation of the unattached granulose or the amylo-cellulose or may be due to the combined action of these elements, only careful quantitative experiments could determine whether or not part of the granulose has gone into solution as a result of applicant's process.

Sulphuric acid is under certain conditions an oxidizing agent but the examiner knows of no authority for the theory advanced in the first full paragraph of page 5, that sulphuric acid acts as an oxidizing agent upon granulose and so decreases its water absorptive properties. Further, the specification furnishes no substantial ground for such a theory. Neither does it for the theory later advanced that the alkali acts on the cellulose as a catalyst.

Claims 37 and 39, based upon the sulphuric acid theory, are untenable.

[fol. 1037] Claim 33 is contradictory, since "dissolved starch" without qualification means starch dissolved in water and the statement next following is that the starch is substantially insoluble in water.

Claims 11 to 14, 16, 17, 19, 20, 22 and 25 are wholly indefinite.

Claims 26 to 28 and 34 to 36 are inaccurate, since the caustic alkali will react upon the constituents of the carbohydrate and the final product will no longer be made up of the constituent ingredients as claimed.

Action on the merits of the claims is deferred pending the filing of satisfactory evidence that the water absorptive properties of the carbohydrate treated have been decreased, and also of data of quantitative experiments establishing the fact that the starch of the carbohydrate when treated by applicant's process does not go into solution, as stated in the second full paragraph of page 5 of the specification.

Ely, Examiner.

W. N. H.

[fol. 1038] Mail Room, Sep. 24, 1910, U. S. Patent Office

Docket Clerk, Sep. 24, 1910, U. S. Patent Office

460,737-6

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460,737. Filed Nov. 2, 1908. For Improvements in Adhesives and Method of Making the Same

Hon. Commissioner of Patents, Washington, D. C.:

Whereas, an application for patent for Improvements in Adhesives and Method of Making the Same was filed on or about November 2, 1908, Serial No. 460,737, by Frank G. Perkins, deceased, late citizen of the United States, and a resident of South Bend, County of St. Joseph and State of Indiana;

Your petitioner, Gertrude S. Perkins, a citizen of the United States and a resident of South Bend, in the County of St. Joseph and State of Indiana, and whose post office address is Dean Building, South Bend, Indiana, Executrix of the last will and testament of the said Frank G. Perkins, deceased (as by reference to the certificate hereto annexed, will more fully appear) prays that the Letters Patent may be granted to her, as Executrix, for the said Improvements

in adhesives and Method of Making the Same, set forth in the specification of said application; and your petitioner hereby appoints the firm of Kenyon & Kenyon (Registered No. 2570), composed of Wm. Houston Kenyon, Alan D. Kenyon, Robert N. Kenyon and Richard Eyre, of 49 Wall Street, New York City, attorneys, with full power of sub- [fol. 1039] stitution and revocation, to prosecute said application, to make alterations and amendments therein, to sign drawings, to receive the patent, and to transact all business in the Patent Office connected therewith.

Signed at South Bend, Ind., this 21st day of Sept. 1910.

Gertrude S. Perkins, Executrix of the Last Will and Testament of Frank G. Perkins.

[fol. 1040] 2-260

Div. 31, Room 169

Paper No. —.

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

Department of the Interior,
United States Patent Office,
Washington, Jan. 6, 1911.

Mailed " " "

Frank G. Perkins, Care Kenyon & Kenyon, 49 Wall St., New York, N. Y.:

Please find below a communication from the Examiner in charge of [the]* your application [of]* No. 460,737, Adhesives and Method of Making the same, filed Nov. 2, 1908.

E. B. Moore, Commissioner of Patents.

This case has been reconsidered in connection with the amendment of Dec. 14, 1910.

The insertion which the last amendment directed to be made after "obviated" in the next to the last line of page

[*Words and figures enclosed in brackets erased in copy.]

3, has not been entered, since the designated word could not be found.

The above referred to insertion does not constitute the evidence called for in the last paragraph of the last office letter. Accordingly it is held that the amendment was not fully responsive to that letter and further action on the merits of the claims is deferred until the requirements of the paragraph referred to are complied with.

Ely, Examiner.

W. W. H.

[fol. 1041] Mail Room, Jan. 12, 1911, U. S. Patent Office

U. S. Patent Office, Received Jan. 13, 1911

Serial No. 460,737

Division 31, Paper No. 9

Letter

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460,737. Filed Nov. 2, 1908. For Adhesives and Methods of Making the Same

49 Wall Street,
New York, N. Y., January 11, 1911.

Hon. Commissioner of Patents, Washington, D. C.

Sir: We duly received an official action on the part of the Patent Office, entitled in the above case and dated January 6, 1911. The action states that the case has been reconsidered in connection with the amendment of December 14, 1910. Applicant's attorneys desire to state that no amendment was filed in this case on or about December 14, 1910, but that an amendment was filed in applicant's co-pending case, No. 460,738, on or about December 14, 1910, which amendment, it is believed, has been entered by the Office in this case when it should have been entered in the co-pending case.

Will the Examiner kindly let us know if this is the case, and if so, what action he takes in the matter.

Respectfully submitted.

Kenyon & Kenyon, Attorneys for Applicant.

[fol. 1042] 2-260

Div. 31, Room 169

Paper No. 10

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

Department of the Interior,
United States Patent Office,
Washington, Jan. 17, 1910.
Mailed " " "

Frank G. Perkins, care Kenyon & Kenyon, 49 Wall St., New York, N. Y.:

Please find below a communication from the Examiner in charge of [the]* your application [of]* No. 460,737, Adhesives and Method of Making the Same, filed Nov. 2, 1908.

E. B. Moore, Commissioner of Patents.

This case has been reconsidered in connection with the letter of Jan. 12, 1911.

The amendment to applicant's co-pending application 460,738, received in the office Dec. 14, 1910, and inadvertently entered in the present application, concerning which office letter of Jan. 6, 1911, was written, has been transferred to the said application. This application awaits action in response to office letter of Sep. 20, 1910.

Ely, Examiner.

W. W. H.

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[*Words and figures enclosed in brackets erased in copy.]

[fol. 1043] Application Room, Apr. 6, 1911, U. S. Patent Office

U. S. Patent Office, Received Apr. 7, 1911

Division 31, Paper No. 11

Serial No. 460,737

C. & Affidavit

United States Patent Office

In re Application of Frank G. Perkins. Ser. No. 460,737. Filed Nov. 2, 1908. For Adhesives and Method of Making the Same

49 Wall Street,
New York, N. Y., April 4, 1911.

Hon. Commissioner of Patents, Washington, D. C.

Sir: In response to the official actions of September 20, 1910 and January 17, 1911, please amend the above entitled application as follows:

Substitute the following specification and claims for the specifications and claims now in the case.

C' My invention relates to improvements Per D. in [adhesives]* glue and the method of making the same and more particularly Per D. to the manufacture of [adhesives or]* Per D. glue from carbohydrates [and especially those]* containing amylo cellulose [or its equivalent]*.

5 In the well known method of making a "starch paste" the solid is mixed with water enough, to make, after tumifying, a paste of such viscosity or density that it can be easily applied. This mixture is then subjected to heat to rupture or burst the cellulose walls and this cooking to a considerable

[*Words and figures enclosed in brackets erased in copy.]

Per D. degree *supposedly* reduces the cellulose to soluble starch, particularly in the presence [fol. 1044] of soluble starch already in solution. To increase the body or viscosity small amounts of ammonia have been added prior to *or after* heating. Such pastes have not the necessary *relative* "tack," [or]* viscosity *cohesiveness* and tenacity to spread and adhere properly when applied as wood glues. [Such a paste is described in U. S. Patent to Higgins 579,827,]* Such pastes in cooling also become *extremely* thick and jelly-like and are practically unsatisfactory for woodwork when originally made with water, or diluted after cooking, because water warps *the wood* and delays drying and the pastes do not set hard enough *and are not dense and elastic enough when dry.* If more water is added in an attempt to make it more fluid, the paste becomes so weak and diluted that it has practically no power and would be wholly unfit for most classes of work, especially wood joints.

Per D.
Per D.
Per D.
Per D.
Per D.
Per D.

Various objects of my invention are to provide a glue and a method of making the same from carbohydrates, which will not have the disadvantages just pointed out, but which will be exceptionally tenacious and powerful but still amply fluid for easy application, and which can be economically and easily produced.

A further object of my invention is to produce a[n]* *glue* [adhesive]* which will have the great practical advantage that it may be practically used for the same purposes as the best *animal* [wood]* glue, and possess certain great advantages of permanency to weather and temperature variations far superior to those of animal glue. As far as I am aware, such conditions have never been met

Per D.
Per D.
Per D.

[*Words and figures enclosed in brackets erased in copy.]

by any prior adhesive made from a carbohydrate base. A further important *object* of my invention is to produce an adhesive or glue base which may [fol. 1045] be stored or sold in a dry state and which may then be prepared for use by mixing up with or without the use of heat. Such improvements are of great practical and industrial advantage and importance and have been much sought.

To do this I first take a carbohydrate of the proper kind, and treat it with a reagent to decrease its water absorptive properties in the sense that to render fluid the finished glue, comparatively little water will have to be added and the final glue will not thereby become seriously diluted. [Another way of

Per D. expressing.]* The effect of this

Insert H'. treatment is also that it decreases the

Per D. viscosity of the glue produced with a given amount of water without detriment to its "tack," quick adhesive properties and cohesion. As a base I

Per H. prefer to use the [carbohydrate]* *starch* secreted by the cassava plant, which has peculiar properties and advantages for this purpose. After being treated as above, the dried material may be mixed with a small amount of water and with a solvent of amylo-cellulose, such as caustic alkali, and a glue produced the strength of which when dry is superior to the lateral

Per D. strength of [the]* wood fiber. [and] which]* *The prepared* glue is very stable in its physical condition, so much so, that it may be kept for days or even weeks after it has been mixed for application without fermentative change. By my

Per D. process *in its preferred form* the glue is free from the complications which attend the use of an adhesive which must be cooked or warmed before use, or kept warm during use, and is more powerful than that which results from the treatment of starch in other ways. My improved glue

[*Words and figures enclosed in brackets erased in copy.]

when made in its best form and properly applied will not only tear away the wood at some point in the [fol. 1046] wood joint produced by the use*d* of this glue, but will tear away the wood at many points whether with or against the grain.

Further objects, advantages and features will more clearly appear from the detailed description given below.

In carrying out one embodiment of my invention I take the cassava carbohydrate or flour in dry form and add at least an equal weight of water. The batch is then agitated and heated to about Per E. 130° F. *which is below the bursting temperature of the starch.* Then I slowly add from 2% to 3% by weight (of the raw carbohydrate) of strong sulphuric acid. This may be considerably diluted if desired before it is added. The same is kept in continual agitation. The agitation preferably produced by thorough stirring is continued for from four to six hours after the acid has been added and then the acid may be neutralized by the addition of a small amount of caustic soda or similar alkali. The acid acts upon the starch or carbohyrate to decrease its water absorptive properties. As the acid appears to remain unchanged in the batch, until neutralized, I believe it acts catalytically to change the molecular condition of the carbohydrate without rendering it substantially soluble in the water. However, great care must be exercised not to have the heat sufficient or the acid in such quantity as to put the starch or carbohydrate in solution. If the action of the acid and heat is carried too far the starch will be changed Per H. [into soluble starch or]* into dextrine, Per H. and will go into solution [to a very material extent if not altogether,]* and as such it would be lost to my process, as I utilize only the suspended material. Even this would cease to have the [fol. 1047] desired properties if the action were carried too far.

[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

That a large part, if not all, of the starch does not, in my improved process, go into solution, is shown by its settling upon stopping the agitation and by the weight and analysis of the product yielded. *The batch therefore has not been converted into dextrin.* Sulphuric and other acids *as well as other starch converting agents* are stated to have a catalytic action affecting the molecular state of amylose or its state of hydration. This I believe to be promoted and equalized by prolonged agitation both together with the action of heat, removing constituents or destroying states of aggregation or polymerization, which are detrimental to the use of the carbohydrate as a glue base. The amount of alkali used is only enough to neutralize the acid. After this has been added, the batch is then cooled, drained and dried and kept in dry form until ready for use.

Per H.

Per H.

I find that the carbohydrate secreted by the cassava plant and known as cassava flour has many advantages over other starches *and* [or]* starchy products and prefer its use *but such other starches or starchy products may be used with more or less success.* Other starchy products from the cassava plant are found to be more or less adaptable and even other starchy products may be used with some little success but they do not produce glues so tenacious and are otherwise more or less undesirable. Some are affected by impurities.

Per H.

Per H.

The above forms the first part of my improved process and the various steps therein may all be carried out at the factory. In commercial use I preferably ship the dry material, obtained as above, to the consumer who carries out the second part of the [fol. 1048] process at the place where the glue is to be used, but if desired the first and second parts of my improved process may be carried out together.

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[*Words and figures enclosed in brackets erased in copy.]

[Words in italic in bold-face type in copy.]

In carrying out the remaining steps in the preparation of my improved glue, the dried base, Per D. obtained as above, is mixed with *about* [from two to]* three parts or less by weight (of dried base), of water according to the strength of the joint and economy desired. The dried base does not materially go into solution in the water unless heat is applied, but a liquid suspension is thereby formed which is agitated and treated with a solvent of cellulose, as, for example, an aqueous solution of caustic soda or potash *alkaline* Per D. *to phenolthalein*, using if cold from six to ten per cent of the weight of the dry base, of caustic soda or its equivalent of caustic potash. The alkali, I believe, acts chemically to unite with one or more starch molecules and with the water to form a colloidal compound. The alkali is best added in the form of a solution of from 33% to 50% strength. Sodium and potassium hydrates are the most available and among the most powerful of the Per D. known solvents of *the starch* cellulose and Per D. are well adapted for [the]* *most* purposes [in question.]*

To take a specific example, a given quantity, say 200 lbs. of the dried amylaceous base was mixed with from 100 to 200 lbs. of water (preferably 225 lbs. or less). After the mixture was thoroughly agitated, 20 lbs. of caustic soda was added in concentrated solution of approximately one part alkali in one to two parts water. This was added with extreme slowness, requiring 15 to 20 minutes for the 50 lbs. solution required. During this time constant stirring was maintained in order to equalize and distribute the action of the caustic *soda* as Per D. [fol. 1094] fully as possible. When normal temperatures were used the result has not been obtained with less than 6 parts of Per D. NaO[h]*H per 100 parts of amylaceous base. The result consists in what is

[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

called the passing over or "coming across" of the mixture and may be described as follows:

During the earlier stages of the addition of the caustic in the above example, little difference in the appearance of the mass was apparent. Soon, however, it became creamy and then more pasty and difficult to stir. When about half the caus-
Per D. tic *soda* had been added, there was faintly observable a minute mottled effect on the surface of the mass being stirred, and it gradually assumed a translucent porcelain-like appearance. If at this time a little of the mixture was squeezed between glass plates portions of the mixture were observed to be transparent and almost invisible. Other portions presented much the appearance of the original mixture of water and suspended
Per D. particles of starch. As the addition of caustic *soda* proceeded accumulations of clearer matter occurred on the sides of the vessel and on parts of the stirrers
Per D. and finally when the [exact]* proper amount of caustic had been added, the entire mass "passed over" or "came across," being converted from a mixture of suspended starch and water containing
Per H. [traces of]* caustic to a homogeneous colloidal compound of starch caustic and water. A little excess of caustic was preferably added to prevent decomposition of the compound by the carbonic acid or moisture of the air.
Per D. [so that as]* *As* much as fourteen per cent
Per D. *NaOH, or the equivalent of other caustic may be* [has been used.]* leaving some free caustic in the prepared glue. The word "compound" is here used in the more modern chemical [fol. 1050] sense of matter connected within the limits of some quantitative relation to produce a definitely recognizable product having certain
Per I. [different]* *definite* physical characteristics.

[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

It is found that temperature affects the amount of caustic required to produce this result and it is believed that as temperature affects the polymerizing or uniting power of the starch molecules, one with another, so it affects the ability of a smaller quantity of caustic to satisfy or bring across a given quantity of starch. It is found that at successively increasing temperatures one is enabled to bring across the mixture with successively decreasing proportions of caustic.

As previously stated, when ordinary starch is heated with water, it absorbs enormous quantities of water, and if only two or three parts of water are used becomes of a stiff jelly-like form which must be very much diluted before it will be practically workable.

I find, however, that using my improved glue base and method of mixing the same, this water absorbing power can be greatly reduced and can be regulated, although the mixing is done with the same proportions of alkali and carbohydrate or else the same temperature, which have hitherto produced unworkable jellies or weakly adhesive pastes or mucilages. And by the use of cassava starch in particular, results can be secured entirely different from those hitherto produced, as stated by others,

Per H. preferably with corn [or potato].* Thus, by proper adjustment of conditions of mixing I am able to produce this glue even with certain grades of untreated cassava carbo-

Per H. hydrate *and with other starches and conversion products (starchy carbohydrates)*. The preliminary treatment, however, substantially reduces the absorption of water by the starch and [fol. 1051] prevents it from becoming

Per D. jelly-like and tough when afterward treated either with the water as above [a]* indicated or with the alkali, or both.

In the second part of my improved proc-

Per D. ess, less than *about* three parts of water

[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

by weight to one part of the dry material are used and after adding the solvent it is found that even with such a small
Per D. amount of water, the batch will assume a
15 *semi*-fluid consistency much superior to that *ordinarily* obtained by the use of water alone and will not become jelly-like and tough as in former processes. The alkali added acts, I believe, to dissolve more or less the cellulose and carbohydrate, uniting with the same and with the
Per D. water and forming [an]* *glue* [adhesive]* of very tenacious properties. The dry carbohydrate is mixed with the water with a carefully regulated heat, if any. The action of heat replaces the action of a portion of the
Per D. caustic in transforming the *glue base, as explained above.* [glue base, and I
Per D. believe that the heat polymerizes the starch molecules (as in jellifying) so that one molecule of caustic combines to satisfy several starch molecules, and as the temperature is increased the quantity of caustic required is di-
Per D. 27 minished].* By the preliminary treatment in reducing the water absorbing power of the carbohydrate, a very con-
Per D. centrated mixture *with* [of the adhesive and]* water may be obtained.

Experiments indicate that after the carbohydrate base has been treated in
Per I. accordance with the first step of my process, [that]* the proportion of amylo-cellulose in the carbohydrate granule has been
5 increased. I believe this increase in the percentage or proportion of the amylo-cellulose in the carbohydrate allows of the same to be changed into a good glue with very much less water than would otherwise [fol. 1052] be required. One way which has been found quite satisfactory for determining when the

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[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

action of the acid or its equivalent, and the agitation, have been carried far enough in the first step, is as follows:

When the carbohydrate glue base which has been dried has been boiled for ten minutes with dry live steam at 100 lbs. pressure with 9 parts of water and tested for viscosity while hot, it showed a viscosity between that of cold water and three times that of cold water.

In specific examples tried, the carbohydrate base, subjected to the above test, [which]* has shown [a]* viscosit[y]ies between that of cold water and three times that of cold water, [have been observed]* but *a product* showing [a product]* about two times the viscosity of water is preferred.

Per D.
Per D.
Per D. 20
Per I. .

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**The carbohydrate glue base is not a "soluble starch" (giving clear solutions in hot water) and it is not a "modified starch" (swelling and gelatinizing in cold water).**

Sub. H2

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[Matter enclosed between rules erased in copy.]

When treated in accordance with my process, I find that the carbohydrate glue base may be formed into glue by using only from one to three parts of water, [but]* the more water used the greater the delay in drying. Preferably less than 4½ parts of water should be used in making the glue from the carbohydrate base.

I believe that the cause of the tenacious properties when carbohydrates are treated with water and a strong solution of an alkali may be traced to the proper proportioning of viscosity, cohesion and adhesion, together with the peculiar chemical action which caustic loosely combined *or free* in the glue as applied, exerts on the cellulose which it in turn combined

Per D.

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[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

Per D. [fol. 10[illegible]3] with, in making the joint to *form alkali metal carbonate, bicarbonate and acetate*. I believe this proper proportioning is due to the partial change of the integument and the proper proportioning of the amylo-cellulose and the grandulose (or the proper mean polymerization) when united with caustic and water. Consequently, I believe that to obtain the best results it is necessary to abstain from reducing the cellulose to true soluble starch, and that sufficient cellulose must be left to make the glue amply tenacious. Therefore, the action of the acid and alkali should not be carried so far nor the temperature be *so*

Per D. [too]* high as to destroy all the cellulose [or]* and impair its strength by changing it into soluble starch and the starch into sugar or textrine.

Also, in actual practice I have found that a good glue is produced by treating the base with the chemicals to reduce the water absorbing power

Per D. to a point where the base *if* [is]* mixed with from 2 to 3 parts of water and subjected to heat of 170° F. would result in a syrupy condition instead of a thick jelly-like mass.

I find that by such suitable treatment under my process it is possible to produce from the base long filaments having a strength similar to threads of animal glue. Practically all the water must be later removed that goes into the glue solution and is applied to the joints, hence an increase of water in the glue solution involves changes in drying methods, or in drying time, or in risks of injury to the material due to warping by the extra water, all of very

Per D. serious consequence. The diluted [mixtures of]* *or adulterated* pastes hitherto made from the natural carbohydrates in

Per D. the manner explained before are [wholly]*

Per D. unfit for [most]* *many* classes of work and especially wood joint work, since they

[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

Per D. [fol. 1054] contain so much water *or adul-*
Per D. *terants* that it takes the joints very long
Per D. to dry or [and]* when they do become
dry there is so little *binding* material left
that only a very weak bond is obtained. Thus it is
of the greatest importance and value to produce a
concentrated glue solution ready for application
which parallels the animal glue solutions now em-
ployed industrially, in respect to water contents and
physical properties in application and is equal or
superior as to strength and permanency.

Certain advantages of my improved process may
be obtained to some extent even although other ma-
terials be mixed with the amylaceous material to
form the glue base.

Per H. [My]* *In the preferred form described*
*my* improved glue is transparent and free
from odor, and is very stable after mixing
Per H. for use, [I have found]* it is instantly
Per H. adhesive to clean surfaces, [Its]* its co-
hesion is very great but not sufficient to
overcome its adhesion and its viscosity
Per H. *is lasting* and low enough to permit ready
application, but so proportioned to its
cohesion that it is capable of being applied by ma-
chinery like hide glue, but still very long tough fibers
are produced if freshly joined surfaces are separated.
I have found that, owing to breakage of these fila-
ments quick separation of such surfaces produces a
crackle like electric sparks. My glue will produce
joints which are practically unaffected by natural
humidity and which are unaffected by pro-
Per D. longed dry heat. [It]* *In the preferred*
*form it* forms a joint with wood or other
cellulosic material, which joint is distin
guished from ordinary mucilages, sizes and pastes
by the fact that it consists of the following layers in
the order named, unaltered cellulosic material, cellu-

*[Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

[fol. 1055] losic material altered by caus-
Per D. tic, [unfriable]* *tough* amylaceous ma-
terial altered by caustic, cellulosic mate-
rial altered by caustic and unaltered cellulose. This joint can probably be distinguished wherever found, by the shading of the above layers into one another when stained with iodine and examined
Per D. under the microscope *and by other tests.* Glued up panels have been placed behind a radiator for 18 months without cracking or separating of the glue joint. These features make my glue especially advantageous for purposes in
Per D. which other *vegetable* glues are practically useless.

Although I have described my improvements in great detail and with much particularity and have mentioned particular compounds which I prefer to use, I desire it to be understood that I do not limit myself to such details and compounds,
Per G. *except as clearly specified in the appended claims, as many modifications and* [as many]* substitutes may be found; but, having fully and clearly described my in-
Per G. vention *with respect to one particular embodiment thereof,* what I claim and desire to secure by letters patent, is:

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1. The process of making a glue base which consists in agitating cassave carbohydrate with water and suitable chemicals to alter the polymerization of the carbohydrate.

2. The process of making a glue base which consists in agitating cassava carbohydrate with water to which an acid reaction has been given to decrease the water absorptive properties of the carbohydrate without rendering it materially soluble in water.

3. The process of making a glue base which consists in agitating a carbohydrate with water to which [fol. 1056] an acid reaction has been given to decrease

[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

the water absorptive properties of the carbohydrate without rendering it materially soluble in water.

4. The process of making adhesive which consists in treating cassava carbohydrate with water and suitable chemicals to decrease its water absorptive properties and leaving a material portion of the carbohydrate insoluble in water.

5. The process of making a glue base which consists in agitating a carbohydrate with water and suitable chemicals to decrease the water absorptive properties of the carbohydrate to properly proportion the viscosity, adhesiveness and cohesiveness resulting when the base is dissolved to form glue.

6. The process of making a glue base which consists in agitating a carbohydrate with water and suitable chemicals to proportion the viscosity, adhesiveness and cohesiveness resulting when the base is dissolved to form glue properly for the appli-
Sub D.' cation of the glue by machinery.

7. The process of making a glue base which consists in treating an amylaceous carbohydrate to increase the proportion of cellulose therein.

8. The improved process of making a wood glue base which consists in mixing cassava carbohydrate with substantially an equal weight of water, heating the same to about 130° F. adding slowing from two per cent to three per cent by weight of carbohydrate of an acid and agitating the batch from four to six hours without rendering the carbohydrate materially soluble in water and then drying the carbohydrate to form a glue base.

9. The improved process of making a wood glue base which consists in mixing a carbohydrate with water, heating the same to about 130° F. adding slow-
[fol. 1057] *ing* from two per cent to three per cent by weight of carbohydrate of an acid and agitating the batch from four to six hours without rendering the carbohydrate materially soluble in water and then drying the carbohydrate to form a glue base.

10. The improved process of making a wood glue base which consists in mixing a carbohydrate with water, heating the same, adding a digesting agent and agitating the batch from four to six hours to materially reduce the water absorptive property of the carbohydrate without rendering the carbohydrate materially soluble in water and then drying the carbohydrate to form a glue base.

11. The improved process of making a wood glue base which consists in mixing a carbohydrate with water, heating the same, adding a digesting agent and agitating the batch to materially reduce the water absorptive property of the carbohydrate without rendering the carbohydrate materially soluble in water and then drying the carbohydrate to form a glue base.

12. The improved process of making a wood glue base which consists in mixing a carbohydrate with water, heating the same, adding a digesting agent and agitating the batch from four to six hours to materially reduce the water absorptive property of the carbohydrate without rendering the carbohydrate materially soluble in water to form a glue base.

13. In the making of adhesives, treating cassava flour with substantially an equal weight of water, heating the same to about 130° F. and adding from 2% to 3% by weight of strong sulphuric acid slowly and with agitation, without rendering the flour materially soluble in water, then neutralizing the acid with an alkali after from 4 to 6 hours agitation.

[fol. 1058] 14. In the making of adhesives treating cassava starch with a suitable amount of water, heating the same and adding acid and agitating to decrease the water absorptive properties of the starch but without rendering the starch materially soluble in water, stopping the agitation after from 4 to 6 hours.

15. In the making of wood glue, treating a starch material insoluble in water with substantially an

equal weight of water, heating the same to about 130° F. and adding from 2% to 3% by weight of a strong acid and thoroughly agitating the bath without rendering the flour materially soluble in water, to convert the material by changing its polymerization a material extent.

16. In the making of adhesives, treating amylaceous material with a reagent to decrease its water absorptive properties, leaving a material portion of the amylaceous material insoluble in water.

17. In the making of adhesives, treating a suitable carbohydrate with an acid and water without rendering the carbohydrate materially soluble in water, to decrease the water absorptive properties of the carbohydrate.

18. A carbohydrate glue base characterized by the facts that it is not soluble as soluble starch (giving clear solutions in hot water) and that it is not a modified starch (swelling and gelatinizing in cold water).

19. The process of making glue, as distinguished from mucilages, sizes and paste, which consists in dissolving an amylaceous material by means of an alkaline digesting agent.

20. The process of making glue which consists in dissolving cassava carbohydrate by means of a suitable digesting agent.

[fol. 1059] 21. The process of making glue as distinguished from mucilages, sizes and pastes, which consists in dissolving cassava carbohydrates in caustic alkali.

22. The process of making a wood glue as distinguished from mucilages, sizes and pastes, which consists of mixing a carbohydrate which is substantially insoluble in water, with water and caustic soda or other equivalent alkali to dissolve the carbohydrate, the total amount of water used being from 1 to 3 parts by weight of the carbohydrate, the amount

of caustic soda used being from 6% to 10% by weight of the carbohydrate or the equivalent weight of other alkali.

23. The process of making a wood glue as distinguished from mucilages, sizes and pastes, which consists in treating below 212° F. a carbohydrate containing amylaceous matter which is substantially insoluble in water with water and adding caustic alkali to dissolve the carbohydrate.

24. The process of making a wood glue as distinguished from mucilages, sizes and pastes, which consists in treating below 212° a carbohydrate which is substantially insoluble in water and caustic alkali to dissolve the carbohydrate, the amount of water used being less than 4½ parts by weight of dry carbohydrate.

25. The process of making a wood glue as distinguished from mucilages, sizes and pastes, which consists in mixing cassava carbohydrate which is substantially insoluble in water, with water and caustic alkali to dissolve the carbohydrate, the amount of water used being less than 4½ parts by weight of dry carbohydrate.

26. The process of making a wood glue which consists in treating a suitable starchy product which is substantially insoluble in water with a solvent of [fol. 1060] cellulose to produce a glue having adhesive powers substantially as great as those of good animal glue.

27. In the making of wood glue, treating a suitable starchy product insoluble in water with a solution of caustic alkali to dissolve the starchy product and yield a compound having substantially the properties of an animal glue.

28. In the making of adhesives, treating cassava carbohydrate with a solvent of cellulose to produce a compound having substantially the properties of an animal glue.

29. In the making of glue, treating a suitable starchy product with less than three parts by weight of water and adding a solution of a caustic soda or other equivalent alkali using 6% to 14% by weight of the caustic soda or its equivalent of other alkali.

30. The process of making glue which consists in properly preparing a vegetable carbohydrate to remove matters injuriously affecting the viscosity and tenacity of the prepared glue and combining the product thus produced with less than four and one half parts of water and an alkaline digesting agent to produce a glue for application.

31. The process of making wood glue which consists in agitating a carbohydrate with a digesting agent to decrease its water absorptive properties and then combining the product thus produced with less than four and one half parts of water to produce a glue for application.

32. The process of making wood glue which consists in agitating a carbohydrate with a digesting agent to decrease its water absorptive properties without rendering the carbohydrate materially soluble in water and then combining the product thus [fol. 1061] produced with water to produce a glue for application.

33. The process of making wood glue which consists in agitating a carbohydrate with a digesting agent to decrease its water absorptive properties without rendering the carbohydrate materially soluble in water and then combining the product thus produced with an alkaline digesting agent and water to produce a glue for application.

34. The process of making wood glue which consists in agitating a carbohydrate with a digesting agent to decrease its water absorptive properties and then combining the product thus produced with caustic alkali and water to produce a glue for application having free caustic alkali therein.

35. The process of making glue which consists in properly preparing a vegetable cassava carbohydrate to remove matters injuriously affecting the viscosity and tenacity of the prepared glue without rendering the carbohydrate materially soluble in water and combining the product thus produced with less than four and one half parts of water and an alkaline digesting agent to produce a glue for application.

36. The process of making wood glue which consists in agitating a cassava carbohydrate with a digesting agent to decrease its water absorptive properties without rendering the carbohydrate materially soluble in water and then combining the product thus produced with water to produce a glue for application.

37. The process of making glue as distinguished from mucilages, sizes and pastes, which consists in agitating cassava carbohydrate with water and a digesting agent to reduce the water absorptive properties of the carbohydrate without rendering it ma- [fol. 1062] terially soluble in water, and then drying the batch and mixing the carbohydrate with water and caustic alkali, the amount of water used being less than four and one half parts by weight of dry carbohydrate, the amount of caustic used being from 6% to 10% by weight of dry carbohydrate, and the caustic being added in the form of a solution, to dissolve the carbohydrate to form the glue.

38. The process of making glue as distinguished from mucilages, sizes and pastes, which consists in agitating a carbohydrate with water and a digesting agent to reduce the water absorptive properties of the carbohydrate without rendering it materially soluble in water, then mixing the carbohydrate with water and caustic alkali, the amount of water used being less than four and one half parts by weight of dry carbohydrate, the amount of caustic used being from 6% to 14% by weight of dry carbohydrate, to dissolve the carbohydrate to form the glue.

39. The process of making glue as distinguished from mucilages, sizes and pastes, which consists in agitating a carbohydrate with water and a digesting agent to reduce the water absorptive properties of the carbohydrate without rendering it materially soluble in water, then mixing the carbohydrate with water and a solvent of cellulose, the amount of water used being less than four and one half parts by weight of dry carbohydrate, to dissolve the carbohydrate to form the glue.

40. The process of making glue as distinguished from mucilages, sizes and pastes, which consists in agitating cassava carbohydrate with water and a digesting agent to reduce the water absorptive properties of the carbohydrate without rendering it materially soluble in water, then mixing the carbohy- [fol. 1063] drate with water and caustic alkali, the amount of water used being less than four and one half parts by weight of dry carbohydrate, the amount of caustic used by being from 6% to 10% by weight of dry carbohydrate, to dissolve the carbohydrate to form the glue.

41. The process of making glue as distinguished from mucilages, sizes and pastes, which consists in agitating cassava carbohydrate with water and a digesting agent to reduce the water absorptive properties of the carbohydrate without rendering it mamaterially soluble in water, then mixing the carbohydrate with water and caustic alkali, to dissolve the carbohydrate to form the glue.

42. The improved glue process which consists in treating cassava carbohydrate with substantially an equal weight of water, heating the same to about 130° F., adding from 2% to 3% by weight of an acid, slowly, and during agitation, neutralizing the batch with an alkali after from 4 to 6 hours' agitation, then cooling and drying the batch, then adding from 1 to 3 parts by weight of water, and then while being agitated treating the same with a solution of a caustic alkali using 6% to 14% by weight of the

dry alkali and applying the resulting product to surfaces with which the caustic is adapted to combine and forming a joint between said surfaces.

43. In the making of adhesives, treating cassava flour with substantially an equal weight from 2% to 3% by weight of strong sulphuric acid slowly and with agitation, without rendering the flour soluble in water, then neutralizing the acid with an alkali after from 4 to 6 hours' agitation, then cooling and drying the batch, then adding from 1 to 3 parts by weight of water and then while being agitated treat- [fol. 1064] ing the same with a solution of caustic alkali using 6% to 10% by weight of the dry alkali.

44. In the making of adhesives, treating cassava starch with a suitable amount of water, heating the same and adding sulphuric acid to decrease its water absorptive properties of the starch but without rendering the starch materially soluble in water, then neutralizing the acid and drying the batch, then treating the dried material with water and caustic alkali to form a glue.

45. In the making of adhesives, treating a starchy material insoluble in water with substantially an equal weight of water, heating the same to about 130° F. and adding from 2% to 3% by weight of a strong acid without rendering the flour materially solule in water, then neutralizing the acid, then cooling and drying the batch and adding from 1 to 3 parts by weight of water and treating the same with a solvent of cellulose to form a glue.

46. In the making of adhesives, treating a suitable carbohydrate insoluble in water with water and a reagent to decrease its water absorptive properties but without rendering the carbohydrate materially soluble in water, then allowing the batch to dry, then treating the same with water and a solvent of cellulose such as caustic alkali to form a glue.

47. In the making of adhesives, treating a suitable starchy product with water and an acid to decrease

its water absorptive properties and after its polymerization but without rendering the starch materially soluble in water, then treating the same with a solvent of cellulose to form a glue.

48. In the making of adhesives, treating a suitable carbohydrate with an acid and water having an acid reaction without rendering the carbohydrate mate- [fol. 1065] rially soluble in water, to decrease the water absorptive properties of the carbohydrate and then treating the carbohydrate with a solvent of cellulose.

49. In the making of adhesives, treating a starchy product substantially insoluble in water with an acid and water to decrease its water absorptive properties without rendering it soluble in water, and also treating it with an alkali to obtain a viscous compound.

50. A glue base composed of starchy material derived from the secretions of the cassava plant.

51. A glue base composed of carbohydrate which when boiled for 10 minutes with dry hot steam at 100 pounds pressure with nine parts of water and tested for viscosity while hot will show a viscosity of approximately two times that of cold water.

52. A base for glue as distinguished from mucilages, sizes and pastes, comprising treated amylaceous grains substantially insoluble in water and the outer so-called amylo-cellulose coating of which grains has been partially but not entirely converted.

53. A base for glue as distinguished from mucilages, pastes and sizes, comprising treated amylaceous grains in which the proportion of so-called cellulose is greater than in the natural material from which the base is derived.

54. A glue composed of cassava carbohydrate which when boiled for 10 minutes with dry hot steam at 100 pounds pressure with nine parts of water and tested for viscosity while hot will show as viscosity

between that of cold water and three times that of cold water.

55. A base for glue as distinguished from mucilages, pastes and sizes, comprising treated cassava [fol. 1066] amylaceous grains in which the proportion of so-called cellulose is greater than in the natural material from which the base is derived.

56. A glue comprising cassava carbohydrate rendered semi-fluid by digestion.

57. A glue comprising cassava carbohydrate dissolved in alkaline digesting agents containing alkali or alkali earth metals.

58. A wood and fiber glue formed from a carbohydrate by direct union therewith of not more than four and one half parts of water and a caustic alkali.

59. A wood and fiber glue formed from amylaceous grains or feculæ by suspension thereof in water and rendered semi-fluid by digestion.

60. A glue containing a carbohydrate base substantially insoluble in water and dissolved by caustic and containing free caustic.

61. A glue consisting of a vegetable carbohydrate base substantially insoluble in water and dissolved by water and caustic alkali, the amount of water being less than four and one half parts by weight of dry carbohydrate and the amount of caustic present less than 10% by weight of the dry carbohydrate.

62. A glue consisting of a vegetable carbohydrate base substantially insoluble in water and dissolved by water and caustic alkali, the amount of water being less than four and one half parts by weight of dry carbohydrate.

63. A glue containing a cassava carbohydrate base substantially insoluble in water and dissolved by water and caustic alkali, the amount of water being less than four and one half parts by weight of dry carbohydrate.

64. A glue consisting of a vegetable carbohydrate base dissolved by water and a solvent of cellulose, [fol. 1067] the amount of water being less than four and one half parts by weight of dry carbohydrate.

65. A wood and fiber glue formed from cassava amylaceous grains or feculæ by suspension thereof in water and rendered semi-fluid by digestion.

66. A glue as distinguished from mucilages, sizes and pastes, consisting of a carbohydrate base substantially insoluble in water and dissolved by water and a solvent of cellulose.

67. A glue consisting of a cassava carbohydrate base substantially insoluble in water and dissolved by less than water and a solvent of cellulose.

68. A glue having a carbohydrate base and substantially unaffected by the natural humidity and having substantially as good adhering qualities as the best animal glue.

69. A glue composed of a carbohydrate base and caustic alkali and substantially unaffected by the natural humidity and having substantially as good adhering qualities as the best animal glue.

70. A glue composed of a cassava carbohydrate base, a solvent of cellulose and substantially unaffected by the natural humidity and having substantially as good adhering qualities as the best animal glue.

71. The improved glue which consists of starchy material, water and solvent of cellulose.

72. The process of making a wood glue which consists in treating a glue base containing amylaceous matter insoluble in water with a caustic alkali properly proportioned substantially as described to produce a glue having a viscosity to flow through pipes and the adhesiveness of animal glue.

72 73. The process of making a wood glue which [fol. 1068] consists in suspending a glue base containing amylaceous matter insoluble in water in less

than 4½ parts by weight of water and adding thereto a caustic alkali properly proportioned substantially as described to produce a glue having a viscosity to flow through pipes and the adhesiveness of animal glue.

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[Matter enclosed between rules erased in copy.]

## Remarks

In the Examiner's action of September 20th, it is stated that action on the merits of the claims is deferred pending filing of satisfactory evidence as to certain points.

The parties in interest have gone to great expense and have retained the services of a consulting chemist in order to clear up these points for the Examiner. The result of all this work shows that it is advisable to amend the specification slightly in many places. Although these amendments are not material, nevertheless, on account of the number of them it has been deemed best and simplest to rewrite the specification and claims in order to avoid multiplicity of minor amendments and in order to place all of the pertinent part of the case together in the file. We believe that the Examiner's criticism of the former specification will not apply to the present specification.

We submit herewith affidavit of a consulting chemist showing that in applicant's process the water absorptive properties of the carbo-hydrate have been decreased when treated in accordance with applicant's process and also showing that quantitative experiments have been carried out, especially showing the fact that the carbo-hydrate when treated by applicant's process does not go materially into solution. We believe that this answers the most of [fol. 1069] the Examiner's criticisms as to the claims. As to the Examiner's objections and criticisms of former claims 37, 39, 33, 11 to 14, 16, 17, 19, 20, 22, 25 to 28 and 34 to 36, we have endeavored in rewriting these claims to make them accurate and definite and to avoid any other criticisms the Examiner has made thereto.

As to the claims now contained in the case, we submit the following. Applcant's claims may be divided up into the following divisions: First, claims drawn to the particular process by which the glue base is obtained; that is,

a dry carbohydrate which is to be used as a base for making glue. Second, claims drawn to the second part of applicant's process, which consists in the treatment of the glue base formed by the first step whereby a resulting glue is obtained which is quite different from what is commonly known as mucilages, sizes and pastes. Third, claims covering the combination of the above two steps. Fourth, applicant's improved glue base product; that is, the product resulting from the first step. Fifth, applicant's improved glue product including the glue making an exceptional joint; that is, the product resulting from the second step, or the combination of the first and second steps.

With regard to the first step of applicant's process, many of the claims are limited to the use of cassava. Applicant has found that cassava is especially adapted as a base for glue, and has considerable advantages over other forms of carbohydrates. Furthermore, the prior art cited does not show any process for producing a glue base; that is, a material especially adapted for use in glue in which the carbohydrate has its polymerization changed. Applicant has found that by the first stage of the process, i. e., we believe [fol. 1070] by changing the polymerization, the quality of the resulting glue is much improved. Furthermore, nothing in the prior art cited shows a glue base which has its water absorptive properties decreased without rendering it materially soluble, nor does the prior art show any such process for proportioning the viscosity and adhesiveness and cohesiveness of the resulting glue. Nor does the prior art show any process for producing a glue base by increasing the cellulose constituent. Claims 1 to 17 are drawn to these features of the first step and are therefore clearly allowable.

Claims 19 to 29 are drawn to the second step. As we have above pointed out, cassava has special advantages over other forms of carbo-hydrate. No prior patent cited discloses the use of cassava for glue. Also no prior patent cited discloses the process for making glue as distinguished from mucilages and pastes, etc., made by dissolving the same by the action of the caustic alkali. That is, we do not mean first dissolving the carbo-hydrate in water and then adding caustic alkali, but actually dissolving the glue by the action of the caustic alkali itself. Furthermore, none of the prior

patents cited discloses the process of making glue by treating a carbohydrate with caustic alkali below 212° F., that is, below the boiling point. We also submit that applicant is the first to produce a vegetable glue having the adhesive properties of the best animal glue. These claims, 19 to 29, are drawn to these features of novelty, and it is therefore believed they are clearly allowable.

Claims 30 to 49 are drawn to the combination of the two steps mentioned. The prior art cited shows nothing disclosing that a carbo-hydrate has been first treated to decrease its water absorptive properties without rendering [fol. 1071] it materially soluble and then dissolving the same by the action of the caustic. Nor does the prior art cited show such a process, in which less then 4½ parts of water are used and leaving free caustic in the resulting glue. These claims are drawn to these features and also the specific quantities and details of applicant's process not shown in the prior art, and it is therefore believed that they are clearly allowable.

Claims 50 to 55 are drawn to the glue base. As before stated, none of the prior patents or prior art cited discloses the use of cassava for glue; nor do any of the prior patents disclose a glue base, which, when boiled for 10 minutes with dry hot steam at 100 lbs. pressure and with 9 parts of water and tested for viscosity while hot will show a viscosity of between that of cold water and 3 times that of cold. Nor does the prior art cited show a carbo-hydrate glue which is insoluble in water with the coating of the granules partially converted. These claims are drawn to these features, and it is therefore believed they are clearly allowable. The remaining claims are drawn to the resulting joint glue product. As before stated, cassava has been found especially advantageous for making glue by applicant, and several of the claims are thus limited. Moreover, applicant's product is distinguished from mucilages, sizes and pastes, in that it is not affected by the natural humidity and has the adhering qualities of the best animal glue and has a viscosity of about 2 times that of cold water. It forms a joint with wood or other cellulosic material, which joint is distinguished from ordinary mucilages, sizes and pastes by the fact that it consists of the following layers in the order named, unaltered cellulosic material, cellulosic material

altered by caustic, unfriable amylaceous material altered [fol. 1072] by caustic, cellulosic material altered by caustic and unaltered cellulose. This joint can probably be distinguished wherever found, by the shading of the above layers into one another when stained with iodine and examined under the microscope. The prior art cited does not show any other vegetable product having these qualities. Nor does the prior art cited show a glue made from a carbohydrate base by dissolving with caustic, which glue is semi-fluid; nor does it show such a resulting glue containing free caustic. Free caustic is undoubtedly especially advantageous in the wood joint, to which the glue is applied. Neither does the prior art show such a glue made up from a carbohydrate base which contains less than 4½ parts by weight of water. These glue product claims are all limited to these various features and it is therefore believed they are clearly allowable.

In view of the above, a reconsideration and favorable action on the case is earnestly solicited.

Respectfully submitted.

Kenyon & Kenyon, Attorneys for Applicant.

[fol. 1073] Application Room, App. 6, 1911, U. S. Patent Office

460,737

Paper No. 11, Affidavit

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460,737. Filed November 2, 1908. For Adhesives and Method of Making the Same

Affidavit

I, William M. Grosvenor, being duly sworn, do depose and says as follows:

I am a chemist by profession and believe that I am qualified to undertake and carry out tests in regard to the process described in the above entitled application for the following reasons:

I began studying chemistry and making chemical tests and experiments in 1886, was graduated with the highest

honors of my class at Polytechnic Institute, Brooklyn, N. Y., in 1893, receiving the degree of Bachelor of Science in chemistry, was invited to become an instructor of chemistry in the Polytechnic thereafter and did in fact act as instructor in analysis the following year under Dr. Peter Austin, the well known chemical expert and investigator. During this time investigations were made and published on perchromic acid. Believing me suited for more advanced work, Dr. Austin advised pursuing chemical studies at Johns Hopkins University, to the Post-Graduate department of which I was admitted in 1894, being the first technical school graduate ever admitted. My studies there embraced advanced chemistry under Dr. Ira Remsen, physics and mathematics under Dr. Joseph H. Ames. [fol. 1074] Thereafter I was employed in special industrial investigation in the interest of D. O. Mills and John D. Rockefeller for nearly a year, during which time also numerous articles were published in the Engineering & Mining Journal and other papers. After completing this work I became chemist at the first Castner Electrolytic Alkali plant established in this country where it was my duty to ascertain yields, determine losses and investigate their causes. In 1896 chemical studies were again taken up under Dr. Edgar F. Smith, of University of Pennsylvania, where investigations were made and published upon the electrolytic production of nitrates and also the production of Azobenzene, where also many organic preparations and analyses were made, terminating in 1898 by graduating as Doctor of Philosophy in chemistry (the first student of that University to specialize entirely on chemistry-electro, organic and inorganic—for the Doctor's degree). Immediately after graduation I was given charge of the cost, determination and plant design and estimation of the Ampere Electro-chemical Co., the entire business of which was the investigation and perfection of new processes. In 1900 I went to the General Chemical Co. as Assistant Superintendent of the Works taken over from E. R. Squibb, and in 1903 was placed in the investigation department of that company, devoting most of my time to investigations in organic chemistry, publishing an exhaustive article on refined methods of analysis of Acetate of Lime and securing U. S. Patent 741,243 for the Process of making Acetate

of Soda. On leaving the General Chemical Co., the manager of the investigation department stated in writing that "Dr. Grosvenor's education is of a very high order; he is an indefatigable worker, painstaking and thorough to [fol. 1075] an unusual degree. He is capable of exhausting any of the scientific problems that are involved in industrial processes." In 1905 I became superintendent of the Contact Process Co. in Buffalo, in pursuance of which work it was necessary to likewise investigate processes and yields, determine losses and ascertain and correct their causes. Since the latter part of 1906 I have been engaged in consulting and expert work at 1123 Broadway, N. Y., have investigated and obtained Letters Patent on certain methods or recovering organic compounds, have studied the behaviour of starch and flour in certain aspects and am permanently retained by four companies all manufacturing organic products on a large scale. During this time papers have been published on Calculations for Dryer Design, Plant arrangement and lay-out, and on the manufacture of sulphuric and nitric acids. I am a member of good standing of the American Chemical Society, Society of Chemical Industry, American Electro-chemical Society and Chemists' Club, N. Y., as well as being a member and one of the directors of the American Institute of Chemical Engineers.

Since the rendering of the Examiner's Action in the above entitled application, namely, September 20, 1910, I have carried out or tested the process described in the above entitled application. On treating the carbohydrate base, as described in the first step of said process, I found that it was not rendered materially soluble in water for the reason that on comparing the weight of material before treatment with the acid and after treatment with the acid I found that the amount of material remaining undissolved was substantially the same as the weight of untreated base used. The fact that the carbohydrate base did not go into [fol. 1076] solution is clearly shown by its settling out, and since the amount of carbohydrate which settles out and remains undissolved after treatment is substantially the same by weight as the amount of carbohydrate put in, it clearly shows that the residue is not merely a small amount of sediment of unattacked granules of amylo-cellulose. I have conducted quantitative experiments which clearly

show that little of the carbohydrate goes into solution. Analyses which I have and caused to be made in duplicate by others also indicate that little if any of the untreated base went into solution. I also found, by actual test with untreated bases and with bases treated in accordance with this step in the process described in said application, that the water absorptive properties of the base had been decreased in the sense that to render fluid the finished glue comparatively little water had to be added whether made by caustic alone or by caustic and heat; in other words, I found that I could produce a glue of the same viscosity with much less water if the base was treated as described by the first step of the process than when it was not so treated. I have found that the treatment with the acid descreased the viscosity of the glue produced with a given amount of water without detriment to its "tack," quick adhesive properties and cohesion.

William M. Grosvenor.

Subscribed and sworn to before me this 6th day of April 1911. James L. Crawford, Notary Public. (Seal.)

[fol. 1077] 2-260

Div. 31, Room 169

Paper No. 10

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

Department of the Interior,
United States Patent Office,
Washington, April 29, 1911.
Mailed " " "

Frank G. Perkins, Care Kenyon & Kenyon, 49 Wall St., New York, N. Y.:

Please find below a communication from the Examiner in charge of your application No. 460,737, Adhesives and Method of Making the same, filed Nov. 2, 1908.

E. B. Moore, Commissioner of Patents.

This case has been reconsidered in connection with the amendment of April 6, 1911.

The reference to the Higgins patent given on page 1 of the substitute specification should be cancelled, since the same is of the nature of a disparaging reference.

Page 7, line 12: "NaOh" should be NaOH.

The statement found on page 9, lines 21-23, that "the action of heat replaces the action of a portion of the caustic in transforming the glue base," is new matter and should be cancelled.

[fol. 1078] U. S. patent to Militz, 941,159, Nov. 23, 1909, application filed Jan. 29, 1908 (127-23), discloses the preparation of a material with soluble starch, which however is insoluble in cold water, which is prepared by the action of an acid upon starch in aqueous solution. This patent meets some of the claims, illustrations of which are claims 3 and 4.

The British patent to Thomson, 21973 of 1906, same class, discloses the preparation of a so-called soluble starch, which is not soluble in cold or in warm water, by the action of sulphur dioxide. This patent seems to meet some of the claims, like claim 18.

U. S. patent to Anderson, 769,289, Sept. 6, 1904 (87-17), discloses an adhesive prepared from tapioca flour, and lines 125-130 of page 2 of the patent, mention the fact that moisture may be used in the process of preparation, which process might be called a kind of digestion. This patent is broad enough to meet some of the claims, illustrations of which are found in claims 15 and 56. Attention is also called to Meyer, 742,469, Oct. 27, 1903 (127-23).

Bloxam's Inorganic and Organic Chemistry, Philadelphia, Blackiston's Sons & Co., 1903, on page 738 describes a process of making carbohydrates waterproof which is applied in the preparation of vegetable parchment. This disclosure meets some of the claims, as claims 3, 16 and 17.

Some of the claims are drawn to theories not capable of demonstration, as the theory of polymerization, which is the foundation on which claims 1, 15 and others are based. Also a number of the claims are based on the theory of the partial conversion of the amilo-cellulose of a particular part of the grain. All the claims based on these theories are untenable.

[fol. 1079] Some of the claims are indefinite, as claims 56, 68 and 71.

Some of the claims are based on new matter, as claim 51 which is drawn to a test for applicant's adhesive which was not disclosed in the original specification.

Some of the claims are drawn to specific proportions of water and adhesive material, which appear from the claims to be critical but which proportions were not disclosed in the original specification: claims 24, 25 and others.

Many of the claims are rejectable upon the grounds above stated. However, all the claims are rejected, on the ground of multiplicity; see ex parte Chapman, 120 O. G., 2446.

Ely, Examiner.

W. W. H.

[fol. 1080] U. S. Patent Office, Received Jul. 14, 1911

Mail Room, Jul. 16, 1911, U. S. Patent Office

Serial No. 460,737

Division 31, Paper No. 13

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460,737. Filed Nov. 2, 1908. For Adhesives and Method of Making the Same

49 Wall St., New York, July 8, 1911.

Hon. Commissioner of Patents.

Sir: In response to the official action of April 29, 1911, please amend the above-entitled application as follows:

In the title in the preamble change the word "Adhesives" to Glue.

Page 2, line 1, change "adhesive" to glue

Same page, line 3, cancel "adhesives or."

Same page, line 4, cancel "and especially those"; same line after "cellulose" insert or its equivalent.

Page 2, line 10, after "degree" insert supposedly.

Same page, line 13, before "heating" insert or after.

Same page, line 14, after "necessary" insert relative; same line cancel "or"; same line after "viscosity" insert cohesiveness.

Same page, cancel line 16.

[fol. 1081] Same page, line 17, after "become" insert extremely.

Same page, line 20, after "warps" insert the wood.

[Cls. 4-7, 10-41, 11-14, 17-18, 20-30, 32-38]*

Same page, line 21, after "enough" insert and are not dense and elastic enough when dry.

Page 2, next to the last line change "an" to a.

Same page, last line, change "adhesive" to glue.

Page 3, line 2, change "wood" to animal.

Page 3, line 18, cancel "Another way of expressing" and change "the" to The.

Same page, line 19, after "is" insert also.

Same page, next to the last line, canel "the".

Same line, cancel "and which" and insert The prepared glue.

Same line, insert a period after "fiber."

Page 4, line 2, after "process" insert in its preferred form.

Page 6, line 12, cancel "from two, to" and insert about.

Same page, line 19, after "potash" insert alkaline to phenolthalien.

Same page, line 27, before "cellulose" insert the starch.

Same line, cancel "the" and insert most.

Same page, line 28, cancel "in question."

Page 7, line 9, after "caustic" insert soda.

Same page, line 19, after "caustic" insert soda.

Same page, line 27, after "caustic" insert soda.

Same page, last line, cancel "exact."

Page 8, line 6, cancel "so that as" and insert As, and change the comma to a period, after "air."

Same page, line 7, cancel "has been" and insert NaOH, or the equivalent of other caustic may be.

Page 9, line 8, change "undicated" to indicated.

Page 9, line 11, before "three" insert about.

[fol. 1082] Same page, line 14, before "fluid" insert semi.

Same line, after "that" insert ordinarily.

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[*Words and figures enclosed in brackets erased in copy.]

Same page, line 19, change "an adhesive" to a glue.

Same page, cancel lines 23, 24, 25 and 26.

Same page, line 22, at the end of the line insert glue base, as explained above.

Page 9, line 27, cancel "is diminished."

Same page, last line, cancel "of the adhesive" and insert with.

Page 7, line 12, change "NaOh" to NaOH.

Page 10, line 18, cancel "which."

Page 10, lines 18 and 19, change "a viscosity" to viscosities.

Same page, line 20, cancel "have been observed."

Same line, after "showing" insert a product.

Same page, line 28, cancel "but."

Page 11, line 4, after "combined" insert or free.

Same page, line 6, after "joint" insert to form alkali metal carbonate, bicarbonate and acetate.

Same page, line 16, change "too" to so.

Same line, change "or" to and.

Same page, line 22, change "is" to it.

Page 12, line 2, cancel "mixtures of" and insert or adulterated.

Same page, line 3, cancel "wholly."

Same page, line 4, change "most" to many.

Same page, line 5, after "water" insert or adulterants.

Same page, line 6, change "and" to or.

Same line after "little" insert binding.

Page 12, line 12 from the bottom, cancel "It" and insert In the preferred form it.

Same page, line 7 from the bottom, change "unfriable" to tough.

[fol. 1083] Same page, line 2 from the bottom, after "scope" insert *and by other tests.*

Page 13, line 2, after "other" insert *vegetable.*

Re-write the claims as follows:

Sub. H[3]

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D'. "1. The process of making a glue base which consists in agitating cassava carbo-

Per G. hydrate with water and *acid or the equiv-*

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[Words in italic in bold-face type in copy.]

Per G. *alent* [suitable chemicals]* *whereby* [to
Per E. alter]* the polymerization of the carbohydrate *is altered.*

2. In the process of making adhesives the treating cassava carbohydrate with
" G. water and acid or its *equivalent* [suitable chemicals]* to decrease its water absorptive properties and leaving a material portion of the carbohydrate insoluble in water.

3. The process of making a glue base which consists in agitating a starchy carbohydrate or its equivalent with water
" G. and *acid or its equivalent* [suitable chemicals]* to decrease the water absorptive properties of the carbohydrate to properly proportion the viscosity, adhesiveness and cohesiveness resulting when the base is dissolved to form glue properly for the application of the glue by machinery.

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[Matter enclosed between rules erased in copy.]

4. The process of making a glue base which consists in agitating a starchy car-
Per H. bohydrate [or its equivalent]* with water
" E. and suitable chemicals *below the bursting temperature of the starch* to proportion the viscosity, adhesiveness and cohesiveness resulting when the base is dis-
Per H. solved to form glue *applicable by machinery.*

5. In the making of adhesives, treating cassava flour with substantially an equal weight of water, heating the same to about 130° F. and adding about 2% or 3% by weight of strong acid slowly and with [fol. 1084] agitation, without rendering the flour materially soluble in water, then neutralizing the acid with an alkali after from 4 to 6 hours' agitation.

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[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

Per H. 6. In the making of a glue base, treating amylaceous material [or its equivalent]* with a reagent to decrease its water absorptive properties, leaving a material portion of amylaceous material in the product insoluble in water.

7. In the making of adhesives, treating a suitable carbohydrate with water and a digesting agent without rendering the carbohydrate materially soluble in water, to decrease the water absorptive properties of the carbohydrate.

Sub. G'

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H'. Per E. " E. " E. " E. " E. 8. A glue base [prepared from starchy material and]* characterized by the facts that it is *prepared from starchy material,* is not soluble as soluble starch (giving clear solution in hot water), [and]* that it is not a modified starch (swelling and gelatinizing in cold water) *and when suitably dissolved has substantially the properties of animal glue.*

" E. " E. " E. 9. The process of making [wood]* glue [as distinguished from mucilages, sizes and paste,]* which consists in dissolving an amylaceous material by means of an alkaline digesting agent *such that a wood glue is formed, as distinguished from mucilages, sizes and paste.*

Sub. H'

" E. " E. 10. The process of making glue [as distinguished from mucilages, sizes and pastes],* which consists in dissolving cassava carbohydrate in caustic alkali or

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[*Words and figures enclosed in brackets erased in copy.]
[Matter enclosed between rules erased in copy.]
[Words in italic in bold-face type in copy.]

Per E. its equivalent *such that a glue is formed as distinguished from mucilages, sizes and paste.*

[fol. 1085] 11. The process of making
Per E. a [wood]* glue [as dis- from mucilages,
" E. sizes and pastes,]* which consists in treating a starchy carbohydrate [or its
Per H. equivalent]* with caustic [soda or its
" H. equivalent,]* *alkali* and water, to dissolve the carbohydrate, the total amount of water used being about 3 parts or less by weight of the carbohydrate, the amount of caustic *alkali used, calculated as NaOH*
Per H. [soda used]* being about 10% or less by
" H. weight of the carbohydrate [or the equivalent weight of its equivalent]*
" H. *so that a wood glue is formed, as distin-*
" E. *guished from mucilages, sizes and pastes.*
" E. 12. The process of making a [wood]*
" E. glue [distinguished from mucilages, sizes and pastes,]* which consists in mixing
" H. [a]* starch[y carbohydrate or its equivalent]* with water and caustic alkali to dissolve the carbohydrate, the amount of water used being about 3 parts or less by weight of dry carbohydrates
" E. *so that a wood glue is formed, as distinguished from mucilages, sizes and paste.*

13. The process of making a wood glue which consists in treating a suitable starchy product a material portion of which is substantially insoluble in water with a solvent of cellulose and about 3 parts or less by weight of water, to produce a glue having adhesive powers substantially as great as those of good animal glue.

14. In the making of glue, treating a suitable starchy product with about three parts or less by weight of water and adding a solution of caustic soda or other equivalent alkali using about 10% or

[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

less by weight of the caustic soda or its equivalent of other alkali to dissolve the product.

Sub. H[5]

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Per G. 15. *In the* [The]* process of making wood glue *the combination of the following steps*, [which consists in]* agitating a starchy carbohydrate or its equivalent [fol. 1086] with a digesting agent to decrease its water absorptive properties and then combining the product thus produced with about three parts or less of
" G. water [to produce a glue for application]*.
" G. 16. *In the* [The]* process of making
" G. wood glue the [which consists in]* agitating *of* a starchy carbohydrate or its equivalent with a digesting agent to properly proportion the viscosity, adhesiveness and cohesiveness resulting when the base is dissolved to form a
Per E. glue *equal to animal glue*.

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[Matter enclosed between rules erased in copy.]

Per H. 17. The process of making wood glue which consists in agitating [a]* starch[y carbohydrate or its equivalent]* with a digesting agent to decrease its water absorptive properties without rendering the carbohydrate materially soluble in *cold* water and then combining the product thus produced with *a solvent of cellulose* [caustic soda and a solution or its
" H. equivalent]* to produce a glue for application, thus proportioning the viscosity, adhesiveness and cohesiveness of the final glue.

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[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

18. The process of making wood glue which consists in agitating a starchy carbohydrate
Per H. [or its equivalent]* with a digesting agent to decrease its water absorptive properties and then combining the prod-
Per G. uct thus produced with alkali [or]* *its equivalent* [alkali earth metal hydrox-
ide]* and water to produce a glue for ap-
Per H. plication having free caustic alkali therein.

Sub. H[6]

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" G. 19. *In the* [The]* process of making wood glue *the combination of the follow-*
" G. *ing steps,* [which consists in]* agitating a cassava carbohydrate with a digesting agent to decrease its water absorptive properties without rendering the carbohydrate materially soluble in water and then combining the product thus produced with water to produce a glue for application.

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[Matter enclosed between rules erased in copy.]

[fol. 1087] 20. The process of making
Per E. glue [as distinguished from mucilages,
" E. sizes and pastes,]* which consists in agi-
" H. tating a starchy carbohydrate [or its equivalent]* with water and a digesting agent to reduce the water absorptive properties of the carbohydrates without renderin[g]* it materially soluble in water, then mixing the carbohydrate with water and caustic alkali, the amount of water used being about three parts or less by weight of dry carbohydrate, the amount of caustic used being about 10% or less by weight of dry carbohydrate, to dissolve

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[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

the carbohydrate to form the glue as
Per E. *distinguished from mucilages, sizes and paste.*

21. The improved glue process which consists in treating cassava carbohydrate with substantially an equal weight of water, heating the same to about 130° F., adding from 2% to 3% by weight of an acid, slowly, and during agitation, neutralizing the batch with an alkali after from 4 to 6 hours' agitation, then cooling and drying the batch, then adding from 1 to 3 parts by weight of water, and then while being agitated treating the same with a solution of a caustic alkali using about 10% or less by weight of the dry alkali and applying the resulting product to surfaces with which the caustic is adapted to combine and forming a joint between said surfaces.

22. In making of adhesives, treating a
" H. suitable starchy carbohydrate [or its equi-
alent]* insoluble in water with water
Per H. with [and]* a reagent to decrease its water absorptive properties but without rendering the carbohydrate materially soluble in water, then allowing the batch to dry, then treating the same with water and a solvent of cellulose such as caustic alkali to form glue.

23. In the making of adhesives, treat-
Per H. ing a suitable starchy carbohydrate [or its equivalent]* with an agent having an acid [fol. 1088] reaction without rendering the carbohydrate materially soluble in water, to decrease the water absorptive properties of the carbohydrate and then treating the carbohydrate with a solvent of cellulose, thus proportioning the viscosity, adhesiveness and cohesiveness of the final glue.

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[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

Per E. 24. A carbohydrate [glue]* base for
Per H. making glue composed of starchy material derived from the secretions of the cassava plant.

[Matter enclosed between rules erased in copy.]

H.

Per E. 24. [25.]* A carbohydrate [glue]* base for making glue composed of suitable carbohydrate which when mixed with about 3 parts or less by weight of water and a solvent of cellulose will form a semi-fluid mass having substantially the adhesive properties of animal glue.

H.

Per E. 25 [26].* A base for making glue as distinguished from mucilages, sizes and pastes, embracing treated amylaceous grains substantially insoluble in water and the outer so-called amylo-cellulose coating of which insoluble grains has been partially but not entirely converted.

H.

Per E. 26 [27].* A [glue]* base for making glue composed of a starchy carbohydrate or its equivalent which when boiled for 10 minutes with dry hot steam at 100 pounds pressure with nine parts of water and tested for viscosity while hot will show viscosity between that of cold water and three times that of cold water.

H.

27 [28].* A base for glue as distinguished from mucilages, pastes and sizes, comprising treated cas- [fol. 1089] sava amylaceous grains in which the proportion of so-called cellulose is greater than in the natural material from which the base is derived.

H.

28 [29].* A glue comprising cassava carbohydrate rendered semi-fluid by digestion

[*Words and figures enclosed in brackets erased in copy.]

Per E. *and having substantially the properties of animal glue.*

H.

" H. 29 [30].* A glue comprising chiefly [a]*
" H. starch[y carbohydrate or its equivalent]*
dissolved by a digesting agent alkaline to
" E. phenol*ph*thalien and *in* about 3 parts or
less by weight of water.

H.

30 [31].* Awood and fiber glue formed
of a starchy carbohydrate or its equiva-
" H. lent by [direct]* union therewith of about
3 parts or less by weight of water and
alkali metal hydroxide.

Sub. H[7]

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32. A wood and fiber glue formed from amylaceous grains or feculæ by suspension thereof in about 3 parts of water or less and rendered semi-fluid by digestion without acid.

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[Matter enclosed between rules erased in copy.]

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H.

Per H. 32 [33].* A glue as distinguished from
mucilages, sizes and pastes containing a
Per H. starchy carbohydrate base [or its equiva-
lent]* substantially insoluble in water and
dissolved by caustic and containing free
caustic.

H.

33 [34].* A glue consisting of a vegetable carbohydrate base substantially insoluble in water and
dissolved by water and caustic, soda
Per H. *alkali* [or its equivalent],* the amount of
water being about three parts or less by

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[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

weight of dry carbohydrates and the amount of caustic present being about 10% or less by weight of the dry carbohydrate.

H.

[fol. 1090] 34 [35].* A glue consisting of a vegetable carbohydrate base substantially insoluble in water and dissolved by caustic

Per H. *alkali* [soda solution or its equivalent],* the amount of water being about three parts or less by weight of dry carbohydrate.

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[Matter enclosed between rules erased in copy.]

Per F

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36 A wood glue joint consisting chiefly of amylaceous matter and alkali metal carbonate, bicarbonate and acetate, the total amount of said compounds calculated as sodium hydroxide being between 3 and 14 per cent by weight of amylaceous matter.

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[Matter enclosed between rules erased in copy.]

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H F

Per H. 35 [36, 37].* A glue containing a starchy

Per H. carbohydrate base [or its equivalent]* dissolved by a solvent of cellulose and water, the amount of water in the glue being about three parts or less by weight of dry carbohydrate.

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[Matter enclosed between rules erased in copy.]

Per F

---

38. A wood glue joint consisting chiefly of amylaceous matter and products evidencing the action of a solvent of cellulose upon the wood fiber.

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[Matter enclosed between rules erased in copy.]

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[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

H F

36. [37 39].* A glue as distinguished from mucilages, sizes and pastes, consisting chiefly of
Per H. a starchy carbohydrate base [or its equivalent]* substantially insoluble in water and dissolved by a solvent of cellulose.

[Matter enclosed between rules erased in copy.]

40. A glue joint containing starch and products of interaction between free caustic metal
Per F. alkali and the *material being joined.*

[fol. 1091] Per H

F.

[38, 41].* A glue having a starchy carbohydrate base or its equivalent and having such a character that it will be substantially unaffected by the natural humidity or changes in humidity and having substantially as good adhering qualities as the best animal glue.

[Matter enclosed between rules erased in copy.]

H. F.

Per I. 37 [39, 42].* A glue composed of a
Per H. starchy carbohydrate base *and a* [or its equivalent and caustic alkali]* *solvent of cellulose* and having such a character that it will be substantially unaffected by the natural humidity and having substantially as good adhering qualities as the best animal glue.

[Matter enclosed between rules erased in copy.]
[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

Per F

43. A wood joint made from a vegetable carbohydrate glue containing free caustic in which the caustic has combined to form a carbonate or bicarbonate and an acetate.

44. The improved wood glue joint which contains starchy material water and alkaline metal acetate an alkaline metal carbonate or bicarbonate.

45. A wood glue joint which consists chiefly of amylaceous matter in juxtaposition with the fibrous material being joined, the fibers of which show the action of a solvent of cellulose.

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[Matter enclosed between rules erased in copy.]

H. F.

38 [40, 46].* The process of making a wood glue which consists in suspending a glue base containing amylaceous matter insoluble in water in about three parts or less by weight of water and treating the base with *an alkali* [caustic soda or its equivalent]* properly proportioned substantially as described to produce a glue having a *lasting* viscosity to flow [fol. 1092] through pipes and the adhesiveness of animal glue."

Per H.
Per H.
Per H.

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Per E. [Add the following claim:]*

F.

41, "47. A wood and fiber glue composed of a base that is chiefly a starchy carbohydrate or its equivalent, and about three parts or less by weight of water" *and which glue has substantially the adhesive qualities of good animal glue.*

Per H.

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[Matter enclosed between rules erased in copy.]
[*Words and figures enclosed in brackets erased in copy.]
[Words in italic in bold-face type in copy.]

Remarks

Applicant's attorneys in complying with the Examiner's criticism as to the multiplicity of claims, have very materially cut down the number of claims but have found that, in order to cover the same ground, the language of many of the claims has had to be considerably changed. However, the Examiner will recognize the old claims in the new claims, since the new claims 1 to 46 inclusive correspond respectively with former claims 1, 4, 5, 6, 13, 16, 17, 18, 19, 21, 22, 25, 26, 29, 31, 32, 33, 34, 36, 40, 42, 46, 48, 50, 51, 52, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72 and 73.

The reference to the Higgins patent has been cancelled and the specification amended as suggested.

The Examiner states with regard to page 9, lines 21 to 23, that the matter therein is new matter and should be cancelled. The statement that "action of heat replaces the action of a portion of the caustic" is submitted to be within the scope of the claims and specification of the original application, and was certainly a part of the original invention. The original specification states that by prefer- [fol. 1093] ence Six to ten per cent of caustic soda is used. Conditions of temperature, hardness of water, condition of glue base, etc., all affect the amount of caustic required, and it is for the purpose of making these matters clear in the light of a better understanding of the physical and chemical actions involved that the phrase is inserted, and, to make the description as full, clear, and exact as possible, it should be allowed to remain. Reychler showed in 1909 that the starch and caustic combine chemically and conform to the law of Gudberg and Waage. Such being the case, some explanation of the varying amount of caustic required to "bring across" or change the glue base into glue is obviously called for. It is perfectly well known that temperature affects the degree of polymerization of chemical substances, even the elements. Fouard showed in 1908 that starch solutions contained various sizes of molecules, separated them to a considerable extent by dialysis through membranes of varying densities, and confirmed the differing molecular dimensions by correspond-

ing specific rotary powers. Wacker in 1908 showed the application of the phenyl hydrazine sulphonic acid test for other polysaccharides, to the various starch products, concluding that erythro and aches dextrine contained four hexose groups, that the more readily soluble granulose contained five, the less readily soluble granulose contained six, the first material removed by decoction from amylocellulose contained seven and the last to be removed contained eight hexose groups. Roux had already shown that with water vapour under pressure the least soluble (most complex) of these were hydrolysed and made soluble (less complex) just as we would hydrolyse or saponify an ester [fol. 1094] and that these hydrolysed products tended to revert or condense into insoluble masses which were again dissolved only at similar temperatures. But it was not until 1909 in his address to the International Congress of Applied Chemistry that Ling in presenting a review of our knowledge of Starch concluded that it was a true polysaccharide, a mixture of several condensation products of monose of various degrees of condensation by abstracting of water, properly represented by the formula $(C_6H_{12}O_6)n\text{-}(N\text{-}1)H_2O$ (mathematically equivalent to the formula arrived at by Kiliani in 1908 from other considerations). Ling pointed out the many evidences that the molecules are mobile and associate and dissociate themselves like alhehyde or the higher alcohols. Applicant stated the fact that variable quantities of caustic could be made to produce the desired result. Claims were drawn in the original application broad enough to cover this part of the invention and there is surely no impropriety or "introduction of new matter" involved in the clearer statement of it.

We therefore believe that it will be clear that the matter contained in lines 21 to 23, page 9, is perfectly proper. It is merely a fuller description of the actual process as carried out in accordance with the directions contained in the original specification. Furtherfore, no new claims are drawn specifically to the use of heat, and therefore no new matter is being claimed whatever. It is believed that the Examiner should permit any such statement as tends to make the process and method of carrying the same out,

more clear. Although the case contains claims broad enough to cover the modification, nevertheless since no claims drawn to specifically cover the same, it is submitted [fol. 1095] that it is not new matter and, under the circumstances, it should be allowed to remain in the case.

Certain claims are rejected upon a U. S. patent to Melitz and British patent to Thomson. The patent to Melitz was filed Jan. 29, 1908. The patent to Thomson was not published until about July 25, 1907. Affidavits of Gertrude S. Perkins and J. B. B. Stryker are filed herewith showing invention that applicant completed his [intention]* before the filing of the U. S. patent to Melitz and before the publication of the British patent to Thomson. It is therefore unnecessary to discuss these patents with respect to the merits of the claims. Some of the claims, such as 15 and 56, are rejected upon U. S. patent to Anderson No. 769,289. The Examiner mentions Claim 15, but since this claim was a very limited claim we assume that what he intended was Claim 55. We will therefore consider Anderson with respect to Claims 55 and 56.

Anderson discloses an adhesive which may be made from wheat-starch, corn starch, Irish potato starch, sago-starch, tapioca flour, sago flour, and arrowroot starch, and which it is said might be made from any variety of commercial starch that is substantially pure and that contains enough moisture to cause the bursting and release of the interior soluble portion of the grain. Cassava is in no sense indicated as particularly desirable, and the Examiner has been fully shown by some samples the relative advantage of cassava over corn and others. Anderson does not make a glue as distinguished from mucilages and paste. It is no more an anticipation of applicant's process than starch which has been made into a paste by a large amount of boiling water in the usual awy of making all starch paste. While in lines 125 to 130, page 2, he mentions that water may be used in the process of preparation, it is apparent [fol. 1096] that this would be necessary if the starch were too dry to explode by the expansion of the moisture it already contains. Only the water which enters the starch

[*Words and figures enclosed in brackets erased in copy.]

granule and is turned into steam is in any way effective in producing Anderson's product, and no such water is used in applicant's product. Anderson does not make a glue, nor a semifluid glue, nor a base for glue as called for by the claims. We submit that it is in an entirely different art, and has no suggestion of the value of cassava or the other features of the claims for making a wood glue. Claim 55 specifies a product comprised of grains, whereas in Anderson the product has been exploded and the structure of the grains destroyed, and Anderson's process would not in any way be expected to increase the proportion of the cellulose.

We are unable to see that the patent to Meyer meets the claims in any way, although a careful consideration has been given to the same.

The Examiner cites against some claims such as former Claims 3, 16 and 17, Bloxam's Inorganic and Organic Chemistry. This reference has been carefully examined, and shows nothing but the well known process of making paper parchment by treatment with a cellulose solvent, sulphuric acid, zinc chloride Schweitzer's reagent, etc.

Claim 3 is not met because it specifies a glue base and not a sheet of paper, and because parchment could not be made by agitation as it would go to pieces. Similarly Claims 16 and 17 are not met because they specify an entirely different product, and there is no evidence that parchmenting decreases the water absorptive properties as stated by applicant in his specification. We further submit that this is an entirely different art, and contains no sug- [fol. 1097] gestions whatever as to the making of a wood glue and can not be taken as an anticipation of applicant's claims.

The Examiner criticises some of the claims in that they are drawn to theories not capable of demonstration. As to these claims being drawn to theories we submit that it is impossible to use scientific language without framing it in terms of accepted theories. If the theories are false the language is no less clear and accurate in meaning; the theory being accepted and recognized as merely a working hypothesis expressive of certain existing phenomena. The alteration of the palymerization of starch is as well established as the existence of definite hydrates in solution, the physical size of the "molecule" or even the "molecule"

itself in view of recent electrophysical research. In view of the authorities cited in discussing the action of heat, the Examiner can hardly contend that the alteration of the "state of molecular aggregation" of starch by the chemicals (claim 1) is a theory. If he still considers it so we must ask him to designate what physical properties he considers indicative of the degree of molecular aggregation. Optical properties, viscosity, water absorptive power, conductivity, capillary constant, etc., can be shown to vary in the treatment of starch and are generally admitted to be indices of molecular change. The same comment applies to former Claim 15. It is not a matter of theory but of analytical determination by two separate analysts and three different methods of determination upon which claims for the partial conversion of the amylocellulose are based. What particular part of the grain it is in may perhaps be admitted in view of the almost unlimited references that can be given where authorities state that the outer portion [fol. 1098] of the starch grain consists of amylocellulose and the inner of granulose. We believe that from the above the Examiner will distinguish between theories unfounded in fact and those legitimate and necessary working hypotheses based on all established facts and without which scientific research and even scientific speech would be impossible.

Some of the claims, such as former Claims 56, 58, and 71 are objected to as being indefinite. With regard to former Claim 56 we are unable to see anything indefinite, and we ask the Examiner to make a little more clear just what he means, or what he considers indefinite, with respect to this claim.

With regard to former Claims 68 and 71, these are now Claims 41 and 44 and, as amended, it is believed that they are perfectly definite.

With regard to former Claim 51 (present Claim 25), this has been amended so that it is believed that the objection no longer attaches. However, we submit that it was not based on new matter so as to render it objectionable for that reason. We submit that the mere fact that the test was not disclosed in the original specification is not sufficient. It would seem to us that if the actual product were described in the original specification, applicant has

a perfect right to incorporate by amendment new phrases or ways of describing the product as long as it is the same product. This is all the applicant has done, and it is therefore believed that since it is exactly the same product which he is claiming as was described in the original specification, there can be no objection to the claims on this ground.

The Examiner objects to some of the claims as drawn to specific proportions of water and adhesive not disclosed [fol. 1099] in the original specification. These claims have all been amended so that it is believed the objection is overcome. Applicant is certainly entitled to cover the process within the limits specified in the claims. It only seems a matter of terms to be used, and applicant has changed the terms to that it is believed the Examiner's criticism is obviated.

With regard to the multiplicity of claims, the number of claims has now been very materially cut down and in view of the extreme importance, and large number of novel features, and the difficulty of fully and clearly describing the same, we believe the Examiner should not require a further reduction in their number.

In view of the above, re-consideration and favorable action on the case is earnestly solicited.

Respectfully submitted,

Kenyon & Kenyon, Attorneys for Applicant.

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[fol. 1100] Mail Room, Jul. 16, 1911, U. S. Patent Office

United States Patent Office

In re Application of Frank G. Perkins. Ser. No. 460,737. Filed November 2nd, 1908. For Adhesives and Method of Making the Same

Affidavit

STATE OF INDIANA,
County of St. Joseph, ss:

I, Gertrude S. Perkins, of Lansdale, Pennsylvania, being duly sworn, depose and say as follows:

I af the widow of Frank G. Perkins whose application for Letters Patent of the United States for Adhesives and

Method of Making the Same was filed November 2nd, 1908 under Serial No. 460,737. I have read the specification of said application and am familiar with the process and product described therein. The said Frank G. Perkins personally described to me the process and product described in said specification long prior to July 1st, 1907, and I personally saw the said Frank G. Perkins carry out said process and produce said product long before July 1, 1907. I have also seen prior to July 1, 1907, said Frank G. Perkins glue together pieces of wood with glue made in accordance with the process described in said specification, which tests proved most satisfactory, and I also know of my own knowledge that the said invention and improve-
[fol. 1101] ments described in said specification which were disclosed to me long prior to July 1st, 1907 were never abandoned by the said Frank G. Perkins.

Gertrude S. Perkins.

Subscribed and sworn to before me this 15th day of May, 1911. Ella C. Baustian, Notary Public. My comm. expires Apr. 7-13. (Seal.)

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[fol. 1102] United States Patent Office

In re Application of Frank G. Perkins. Ser. No. 460,737. Filed November 2nd, 1908. For Adhesives and Method of Making the Same

Affidavit

State of Pennsylvania,
County of Montgomery, ss:

I, Julius B. B. Stryker, of Lansdale, Pennsylvania, being duly sworn, depose and say as follows:

I personally knew for some years prior to July 1st, 1907 Frank G. Perkins, whose application for Letters Patent of the United States for Adhesives and Method of Making the Same was filed November 2nd, 1908, under Serial No. 460,737, and I have read the specification of said application and am familiar with the process and product described therein. Prior to July 1st, 1907 said Frank G. Perkins described to me the process and product as set

forth in said application, and I personally saw and helped Mr. Perkins to carry out said process and produce the glue product described therein. Also prior to July 1st, 1907, I personally saw and helped said Frank G. Perkins test the process and product described in said application and glue together pieces of wood with glue made in accordance with the process described in said application. These pieces of wood which were glued together showed that the glue produced by said process had a remarkable tenacity and that the glue was very satisfactory for use in wood joint [fol. 1103] work. I also know of my own knowledge that the said invention described and claimed in said application has never been abandoned.

J. B. B. Stryker.

Subscribed and sworn to before me this 15th day of May, 1911. A. R. Place, Notary Public. Commission expires January 26, 1915. (Seal.)

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[fol. 1104] 2-260

Div. 31, Room 169

Paper No. 14

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

Department of the Interior,
United States Patent Office,
Washington, July 25, 1911.
Mailed " " "

Frank G. Perkins, care, Kenyon & Kenyon, 49 Wall St., New York, N. Y.:

Please find below a communication from the Examiner in charge of your application No. 460,737, Adhesives and Method of Making the same, filed Nov. 2, 1908.

E. B. Moore, Commissioner of Patents.

This case has been reconsidered in view of the amendment and affidavit of July 10, 1911.

It is thought that the case still contains an undue multiplicity of claims.

If it be granted that polymerization occurs in the starch molecules, as applicant has set forth, it is thought that the expression "to alter the polymerization of the carbohydrate," found in claim 1, is objectionable. If reference is to be made in the claim to polymerization the same should occur in the "whereby" clause or its equivalent.

On reconsidering the application it is noted that Higgins, 579,827, Mch. 30, 1897 (87-17, paste,) discloses the use of the same acid and the same alkali as is employed by [fol. 1105] the applicant, and that the proportions of these substances which he uses are within the limits of those laid down by the applicant in many of the present claims. Further, Higgins states that his product will draw or spin out in ropy or silky threads, and that it can not be distinguished by the ordinary observed from a fine glue. Accordingly, claims 4 and 16 are not seen to distinguish from Higgins.

Claim 8 is objectionable in that it contains no positive characteristic, defining the product merely by negative terms.

Claims like 9 to 12 and 20 are objectionable in that the distinguishing feature of the claim must follow "consists" and not be a part of the introductory clause, as is the expression "as distinguished from mucilages, sizes and pastes."

Again, claims 9 to 14 are not seen to distinguish from Higgins. The proportions given in claims 13 and 14 appear to be within the limits that are disclosed in the Higgins patent.

Claims like 24 and 29 are indefinite. In claim 24 the expression "a glue base" is of uncertain significance, and in claim 29 to simply call the product a "glue does not describe its physical properties with such clearness as to properly define the article.

Claims like 25 to 35, 37, 39, 41, 42 and 47 are not seen to distinguish from Higgins.

It is noted that claim 27 differs from former claim 51 in that the present claim uses the expression "three times that of cold water," whereas the former claim contained the expression "two times."

Claims 36, 38, 40 and 43 to 45 are for a joint. It is thought that this is not a statutory subject of invention. Even if it were these claims would be for subject matter divisible from that of the other claims. Division is there-
[fol. 1106] fore required between the above mentioned claims and the remaining ones.

It is noted that claim 36 includes elements not mentioned in the original specification.

Formal action on the merits is suspended pending compliance with the above requirement.

Ely, Examiner.

W. W. H.

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[fol. 1107] Mail Room, Aug. 3, 1911, U. S. Patent Office

U. S. Patent Office, Received Aug. 4, 1911

Serial No. 460,737

Division 31, Paper No. 15

E

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460,737. Filed Nov. 2, 1908. For Adhesives and Method of Making the Same

49 Wall Street,
New York City, August 2, 1911.

Honorable Commissioner of Patents, Washington, D. C.

Sir: In response to the Official action of July 25th, 1911, please amend the above entitled application as follows:

Claim 1 line 3, cancel "to alter" and insert "hereby."

Same line, after 'carbohydrate' insert "is altered."

Claim 4 line 3, after 'chemicals' insert "below the bursting temperature of the starch."

Claim 8, line 1, cancel "prepared from starchy material and."

Same claim line 2, after "is" insert "prepared from starchy material, is."

[fol. 1108] Same claim, line 3, cancel "and," and insert a comma.

Same claim, at the end insert "and when suitably dissolved has substantially the properties of animal glue."

Claim 9, line 1, cancel "wood."

Same claim lines 1 and 2 cancel "as distinguished from mucilages, sizes and paste."

Same claim, at the end insert "such that a wood glue is formed, as distinguished from mucilages, sizes and paste."

Claim 10, lines 1 and 2, cancel "as distinguished from mucilages, sizes and pastes."

Same claim at the end insert "such that a glue is formed, as distinguished from mucilages, sizes and paste."

Claim 11, line 1, cancel "wood."

Same claim lines 1 and 2, cancel "as distinguished from mucilages, sizes and pastes."

Same claim, at the end insert "so that a wood glue is formed, as distinguished from mucilages, sizes and paste."

Claim 12, line 1, cancel "wood."

Same claims lines 1 and 2, cancel "as distinguished from mucilages, sizes and pastes."

Same claim, at the end insert "so that a wood glue is formed, as distinguished from mucilages, sizes and paste."

Claim 16, last line, before 'glue' insert "a."

Same claim after 'glue' insert "equal to animal glue."

Claim 20, lines 1 and 2, cancel "as distinguished from mucilages, sizes and pastes."

Same claim, at the end insert "as distinguished from mucilages, sizes and paste."

Claim 24 line 1, cancel "glue" and insert "carbohydate."

[fol. 1109] Same line, after 'base' insert "for making glue."

Claim 25 line 1, cancel "glue" and insert "carbohydrate."

Same line after 'base' insert "for making glue."

Claim 26 line 1, before 'glue' insert "making."

Claim 27, line 1, cancel "glue."

Same line, after 'base' insert "for making glue."

Claim 29 at the end insert "and having substantially the properties of animal glue."

Claim 30 line 3, correct the spelling of phenolphthalien."

Claim 47, at the end insert "and which glue has substantially the adhesive qualities of good animal glue."

Page 4 of the specification, line 18, after "130° F" insert "which is below the bursting temperature of the starch."

Remarks

From the Examiner's action we take it that he finds claim 1 objectionable for the reason that the claim should state the result accomplished, by a "whereby" clause. The claim has been amended as suggested, and it is therefore thought to now be clearly allowable.

The Examiner states that Higgins patent No. 579,827 discloses the use of the same acid and the same alkali as employed by applicant, in that the proportions of these substances which he uses are within the limits of those laid down by applicant in many of the present claims. While it is true that Higgins specifies the use of the same [fol. 1110] acid and also the use of the same alkali, nevertheless, Higgins uses his alkali for an entirely different purpose. Higgins uses his alkali merely to neutralize the acid. Higgins therefore forms neutral salts with his alkali and acid, which apparently have no material effect upon the starch, as far as its forming a glue is concerned.

Applicant takes a substantially neutral product and adds the alkali to dissolve the starch which is largely insoluble in water. Thus the action is entirely different in applicant's process and product from that in Higgins. The Higgins patent is not for the making of glue, but merely a paste, or mucilage, and his own specification bears this out. In lines 9 and 10 he states that the object of his invention is to produce an improved paste or adhesive compound. He says that it has much greater adhesive power and tenacity than any previous starch or flour paste. But this property is nothing more than that of a good mucilage. Ordinary mucilage has the same properties, as he states. All through his specification he calls it a paste and never

considers it as an equivalent of good animal glue. On page 4, lines 28 and 29 he states it can be readily substituted for glues and gelatins in many kinds of work, but this statement is also true of mucilages, as a good mucilage may be substituted for glue in many kinds of work. But this does not make it a glue as distinguished from mucilages, sizes and paste: The tenacity and adhesiveness of the two are greatly different. In lines 32 and 34 he states "glue like paste is produced which is almost equal to the best animal glues." This shows that it is not equal to the best animal glues, and since it is nothing but a paste or a mucilage it cannot be used for wood veneer work and similar purposes for which animal glue is used, even al- [fol. 1111] though it might be used for some purposes for which glue is used. We do not doubt that Higgins produced an especially good mucilage, but these statements show nothing more than that. The reasons why he did not get a good glue are undoubtedly many. One of them is undoubtedly that he did not use the proper kind of a base. He used corn starch, which is not suitable unless especially treated. Cassava has many advantages over corn starch. He, furthermore, did not treat his starch with caustic or dissolve it by caustic. His starch, as he says was dissolved by or rendered soluble by the acid. He particularly states that the caustic soda was only added to neutralize, and therefore, it was not the action of the caustic which dissolved the starch. Other differences in the two processes are of importance, and show that Higgins did not get the results of applicant.

On page 4, lines 36 etc., he states "it will unite with the wood nearly as firmly as gelatin, that is, the joint cannot be separated without breaking the wood at some point." This statement also clearly shows that Higgins did not produce a glue like animal glue. He admits that it unites wood to wood only "nearly" as firmly as gelatin does, admitting that it was far from the equivalent of an animal glue. He also states that the joint cannot be separated without breaking the wood at some point. This all indicates that his product was not at all the equivalent of animal glue. At a personal interview with the Examiner last April we believe it was clearly shown to him that applicant's product formed a wood to wood joint which could not be separated without

breaking the wood at many points, in fact, the wood was broken away over nearly the entire area of the joint. It is these results which make it equivalent to an animal glue. [fol. 1112] It is therefore clear that Higgins made nothing more than a very pure mucilage. He states, on page 4 lines 42 and 43, "This paste is of a pure creamy white." The fact that it is creamy white shows that it is not a glue, but a mere mucilage paste. We do not doubt that Higgins product will draw or spin out into ropy or silky threads. This is a property which is possessed by mucilages and pastes and even sizes, so that it is not especially characteristic of a glue. Another reason why Higgins does not get a glue equivalent to animal glue is undoubtedly that he bursts his starch by using a high temperature. He raises his temperature rapidly to about 195°. This is above the bursting or tumifying temperature of the starch. The starch must of necessity be bursted and largely rendered soluble. The fact that Higgins product might not be distinguished by the ordinary observer from a fine glue does not seem to us to be important, when it is clear from his specification that he does not make a fine glue. Undoubtedly one skilled in the art would easily distinguish it from a glue even from the ropy or silky threads. But, of course, any one would be able to distinguish it from a glue upon trying it out with a wood joint.

Claim 4 is for the making of a glue base. Higgins does not make a glue base, and therefore is not relevant to this claim. However, the claim has been amended to bring in the fact that the process is carried out below the bursting temperature, so that Higgins is clearly differentiating from.

Claim 16 is also clearly allowable over Higgins since it specifies that the viscosity, adhesiveness and cohesiveness is so proportioned as to form a glue equal to animal glue. Higgins does not so proportion the viscosity, ad- [fol. 1113] hesiveness and cohesiveness as to form a glue equal to animal glue. This is admitted by his own specification.

Claim 8 is objected to in that it contains no positive characteristic. This claim has been amended to include the positive characteristic that it is (1) a glue *base*, (2) prepared from starchy material, and (3) when suitably dissolved has substantially the properties of animal glue. It is therefore believed that the claim is now clearly allowable.

Claims 9 to 12, and 20, are held to be objectionable in that the distinguishing features must follow the word "consists." We believe that the claims are limited by the distinguishing feature, even if they do not follow the word "consists." However, since it appears to make no difference from our point of view we are amending these claims so as to put the distinguishing feature, as the expression "as distinguished from mucilages, sizes and paste," so that it follows the word "consists." We believe the Examiner clearly appreciates that with the claims so limited they are not in any way anticipated by Higgins. The above argument clearly shows they are not. Furthermore, these claims are clearly allowable over Higgins for other reasons.

Claim 9 specifies that the amylaceous material is dissolved "by means of an alkaline digesting agent." Higgins does not dissolve by means of an alkaline digesting agent, but by means of an acid. His caustic soda is merely used to neutralize, and does not dissolve the starch. In applicant's process it is the caustic which dissolves the starch, and the claim is so limited.

Claims 10 and 11 are similarly limited. Likewise, claim 12 specifies that the base is treated with "caustic alkali to [fol. 1114] dissolve." This clearly differentiates from Higgins who uses the caustic alkali merely to neutralize.

Claim 13 is clearly allowable over Higgins because it specifies treating of the starchy product "with a solvent of cellulose." Higgins does not treat the starchy product with a solvent of cellulose, but treats the acid with a solvent of cellulose merely. Nor is the weak acid he uses a solvent of cellulose. Furthermore, this claim is limited to the process adjusted to produce a glue having adhesive powers substantially as great as good animal glue. We have already pointed out that Higgins does not have this.

Claim 14 also specifies that caustic soda is added to dissolve the product. We have already pointed out that Higgins does not add caustic to dissolve the product at all; it is already dissolved before he adds his caustic soda.

Claims 24 and 29 are held to be indefinite. It is specified with respect to claim 24, that the expression "a glue base," is of uncertain significance. Claim 24 has therefore been amended to avoid this criticism, and claim 29 has been

amended so that the physical properties are described with sufficient clearness to properly define the article.

The Examiner states that claims 25 to 35, 37, 39, 41, 42, and 47, are not seen to distinguish from Higgins. It is believed that each of these claims are clearly allowable over Higgins. In the first place, with regard to claim 25, Higgins makes no glue base at all. He starts off with raw starch, apparently. Raw starch will not respond to the test mentioned in claim 25. It is therefore believed the claim is clearly allowable. Certainly the finished glue of Higgins will not respond to the test.

[fol. 1115] With regard to claim 26, this also specifies a definite article, in other words, a base for making glue. The only base which Higgins discloses is a raw starch, and this does not embrace treated amylaceous grains, the outer coating of which has been partially but not entirely converted.

Claim 27 also specifies a test to which Higgins raw starch paste will not respond. It is therefore thought this claim is clearly allowable over Higgins.

Claim 28 specifies cassava. It is clearly pointed out in the specification that cassava has special advantages over other forms of starchy material and for this reason the claim should be clearly allowable. It also specifies that the so-called cellulose of the grains be greater than in the natural material from which the base is derived. This is not found in Higgins.

Claim 29 likewise specifies cassava, and also specifies particular properties of the product which Higgins does not have. Higgins does not produce a glue having the properties of animal glue, as will be clear from the argument given above.

Claim 30 is differentiated from Higgins in that it specifies that the carbohydrate be "dissolved by a digesting agent alkaline &c." Higgins carbohydrate is not dissolved by an alkaline digesting agent, but by an acid, as clearly pointed out above.

Claim 31 is also clearly allowable over Higgins in that it specifies that the alkali metal hydroxide enters into "direct union" with the carbohydrate. Higgins does not disclose this. Higgins alkali metal hydroxide merely enters into direct union with the acid to neutral the same.

Claim 32 specifies that the grains be rendered semi-fluid [fol. 1116] "without acid." This clearly differentiates from Higgins.

Claim 33 also specifies that the carbohydrate be "dissolved by caustic" and contain free caustic. We have already shown that Higgins carbohydrate is not dissolved by caustic but by acid.

Claim 34 also specifies that the carbohydrate be dissolved by caustic soda or its equivalent. Acid is not an equivalent for dissolving a carbohydrate.

Claim 35 is similarly limited.

Claim 37 specifies that carbohydrate be "dissolved by solvent of cellulose," but the weak acid used by Higgins is not a solvent of cellulose.

Claim 39 and also claim 33, specify a glue as distinguished from mucilages, sizes and pastes, which Higgins does not show. Furthermore, claim 39 specifies that the starchy base shall be "dissolved by solvent of cellulose." As already pointed out this is not shown by Higgins.

Claim 41 also specifies a glue having as good adhering qualities as the best animal glue. We have already pointed out that Higgins does not show this.

Claim 41 should be allowed for the same reasons.

Claim 47 has been amended to more clearly distinguish applicant's invention from Higgins, and it now specifies a glue having properties which Higgins product does not.

It is therefore believed that all of these claims are clearly allowable.

In this respect we desire to state that this Higgins patent was very carefully considered before the submission of these claims, and since it is clear that Higgins does not produce a glue product at all similar to applicant's, it is believed the claims are clearly allowable.

[fol. 1117] With regard to the criticisms in respect to claim 27, in which the Examiner states that it uses the expression "three times that of cold water," whereas former claim 51 contained the expression "two times," we desire to state that present claim 27 merely states that it shows a viscosity between "that of cold water and three times that of cold water," and in this respect it is like former claim 54.

With regard to claims 36, 38, 40 and 43 to 45, the Examiner states that it is thought that these claims which are for a joint, are not a statutory subject of invention. We are unable to perceive any reason why they are not the subject of invention. They are obviously for a product which has great utility, and products and manufactures like this are most common statutory subjects of invention. The Examiner further states that even if it were these claims would be for subject matter divisible from that of the other claims, and accordingly, the Examiner requires division. We submit that action on the merits should not be suspended pending a compliance with the requirements for division, as in this case under the rules, division should not be required, but if the Examiner considers that the claims last mentioned should be divided out he should reject them for that reason, since applicant presented the other claims first, and inserted these by amendment. We therefore request that the Examiner give us full action on the merits, in his next action. We, however, submit that division should not be required between the claims mentioned and the remaining claims. It was stated in ex parte Dallas, 106 O. G. 996, that where the process set forth in some claims necessarily produces the product set forth in others, and there is a close relationship between them, although it is possible [fol. 1118] that the product may be made by other processes, held that the claims may be retained in one application, if no wider range of search is required. To this same effect is Adams, 106 O. G. 541.

It will be observed that whenever applicant's particular form of process as stated in his specification, is carried out and put into use, as upon wood, the wood joint claimed is bound to be the resulting product. It therefore seems to us clear that division should not be required in this case as the claims are obviously closely related.

With regard to the criticism of claim 36 in that it includes elements not mentioned in the original specification, we beg to state that although in claim 36 the particular elements mentioned were not stated in the original specification in the exact words given, nevertheless, they were impliedly so stated, because whenever the particular glue described was put to use in a wood joint, it was bound to produce the alkali metal carbonate, bicarbonate and acetate,

and in the quantities mentioned. These compounds undoubtedly result from the inclusion of the free caustic in the glue. It will therefore appear that although the new product, the resulting glue joint, was not particularly described in the original specification, nevertheless, amply sufficient information was given in the origial specification to produce that product, and in fact if the original specification was carried out it would be bound to produce this product, namely, the resulting glue joint, with the carbonate, bicarbonate and acetate therein. The inclusion of these terms now is merely more clearly specifying what was already included in the original specification. The original specification obviously contained sufficient information to enable one to produce the particular product described in [fol. 1119] claim 36, and in fact, described a process which was bound to produce that product. Such being the case, we believe there can be no objection to the claiming of that product in detail now, and that claims to it should not be divided out but should be included in this application.

Applicant's attorneys desire to make the number of claims as small as possible, and have gone over the same with that in view, but are unable at present to see how the number can be cut down without prejudicing the case unduly. It is believed that all of the claims are materially different in scope, and therefore all should be allowed in the case.

In view of the above a reconsideration and favorable action on the case is earnestly solicited.

Respectfully submitted.

Kenyon & Kenyon, Attorneys for Applicant.

[fol. 1120]

2-260

Div. 31, Room 169

Paper No. 18

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the aplicant.

AHS.

Department of the Interior,
United States Patent Office,
Washington, Aug. 31, 1911.
Mailed " " "

Frank A. Perkins, c/o Kenyon & Kenyon, 49 Wall St., New York City:

Please find below a communication from the Examiner in charge of your application No. 460,737, filed Nov. 2, 1908, Adhesives and Method of Making the Same.

E. B. Moore, Commissioner of Patents.

Responsive to amendment filed Aug. 3, 1911.

Claims 36, 38, 40 and 43 are for a joint. This is subject matter that cannot be properly classified under class 87-17, the sub-division under which the subject matter of the remaining claims is properly classifiable. The requirement for division is thought, therefore, to be correct and is repeated. Further, ex parte Pickles, 100 O. G. 1888, states in substance that when division is required it must be settled before the Office will examine on the merits. In accordance with the ruling in the above case, action on the merits is deferred until the requirement for division is complied with.

Ely, Acting Examiner.

W.W.H.

[fol. 1121] Mail Room, Sep. 6, 1911, U. S. Patent Office

U. S. Patent Office, Received Sep. 11, 1911

Seiral No. 460,737

Division 31, Paper No. 17

F

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460,737. Filed November 2, 1908. For Adhesives and Method of Making the Same

49 Wall Street, New York City, September 5th, 1911.

Honorable Commissioner of Patents, Washington, D. C.

Sir: In response to the Official action of August 31st, 1911, please amend the above entitled application as follows:

Cancel claims 36, 38, 40, 43, 44, and 45.
Adjust the ordinals of the remaining claims.

Remarks

The above amendment cancels the claims held by the Examiner to be classified in another class, and which he required to be divided out.

The above, we believe, complies in full to the Examiner's requirement, and in view thereof a reconsideration and favorable action on the merits is earnestly solicited.

Respectfully submitted.
Kenyon & Kenyon, Attorneys for Applicant.

[fol. 1122] 2-260

Div. 31, Room 169

Paper No. 19

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

Department of the Interior,
United States Patent Office,
Washington, Sept. 22, 1911.
Mailed " " "

Frank A. Perkins, Care Kenyon & Kenyon, 49 Wall St., N. Y.:

Please find below a communication from the Examiner in charge of your application Ser. No. 460,737, filed Nov. 2, 1908, for Adhesives and Method of Making the Same.

E. B. Moore, Commissioner of Patents.

This is in response to amendment filed Sept. 6, 1911.

Claims 1 to 3 contain no positive step that differentiates them from one another. The attempted differential ion is based upon a result that is attained. Further in claim 1 this result is hypothetical. The positive step of treating cassava carbohydrate with water and suitable chemi-

cals is so indefinite as to be unpatentable. Claims 1 to 3 are therefore rejected.

In claim 8 the expression "suitably dissolved" added by amendment is indefinite since water alone will not dissolve the glue base and the expression by itself does not imply the use of any solvent other than water. The claim is rejected.

[fol. 1123] A process claim which distinguishes from the prior art only in a statement of definite alleged results obtained is not so phrased as to render it allowable. Claim 9 is open to this objection and is accordingly rejected.

As understood the cassava must be modified before the alkali treatment is effective so as to produce the glue. Claim 10 is incorrect in that it appears to set forth that unaltered cassava when treated with caustic alkali would give the glue product, and is accordingly rejected.

Claim 15 is rejected as incomplete since the treatment of the modified carbohydrate with water alone is insufficient to complete the process.

Claims 16 and 19 are rejected as incomplete on the grounds similar to that pointed out in claim 15.

Where is the warrant for the inclusion of the expression "alkali earth metal hydroxide" in claim 18?

If a patent is granted and some one should infringe by putting on the market an alleged infringing product in order to sustain the patentee's contention his product claims must be defined in such terms that his product itself would carry its own marks of identification by which the competing product could be determined to be an infringing product. It is not seen that the applicant has defined his product by such distinguishing marks as could be relied upon in proving an infringement. In claim 29 for example what is there in the definition of this claim by which the product itself could be distinguished so as to identify other products as infringing. Again some of the product claims are defined in large part by the process of making as claims 25, 27, 30 etc. This is objectionable. Other product claims are defined in part upon and hypothesis as claim 26. Still [fol. 1124] others are defined in part upon an alleged superiority as claim 28. Regarding this latter method of distinction it would not be proper to define a motor as having a higher horse power per pound of weight than any

heretofore made neither is it proper to define a product as possessing an alleged desirable or superior characterist-*s*. Note the expression in this claim "greater than in the natural material." Still again it is to be noted that in claim 37 for example the definition is based upon characterist-s of the product that *is* no longer existant, in other words upon characteristics that belong to an intermediate product.

Claims 24 to 39 and 41 are rejected upon the grounds above stated.

The inconsistency in claim 27 with reference to the expression "three times" pointed out in the Office letter of July 25, 1911, has not been corrected.

Ely, Examiner.

W.W.H.

[fol. 1125] Mail Room, Oct. 24, 1911

U. S. Patent Office, Oct. 25, 1911

Serial No. 460,737

U. S. Patent Office, Division 31

Paper No. 19

G

United States Patent Office

In re Application of Frank G. Perkins. Serial No. 460,737. Filed Nov. 2, 1908. For Adhesives and Method of Making the Same

49 Wall Street,
New York City, October 21st, 1911.

Honorable Commissioner of Patents, Washington, D. C.

SIR: In response to the official action of September 22, 1911, please amend the above entitled application as follows:

Page 13 of the substitute specification, line 7.

After 'compound' insert "except as clearly specified in the appended claims."

Same line, after 'many' insert "modifications and."

Same page, line 8, after 'invention' insert "with respect to one particular embodiment thereof."

Claim 1, lines 2 and 3, cancel "suitable chemicals" and insert "acid or its equivalent."

Claim 2, line 2, cancel "suitable chemicals" and insert "acid or its equivalent."

Claim 3, line 3, cancel "suitable chemicals" and insert "acid or its equivalent."

Rewrite claims 8 and 9 as follows:

[fol. 1126] Sub. H[1]

G[1]. "8. A glue base characterized by the facts that it is prepared from starchy material, is not soluble as soluble starch (giving clear solutions in hot water), that it is not a modified starch [Cls. 8, 9.]* (swelling and gelatinizing in cold water), and when dissolved by a solvent thereof has substantially the properties of animal glue.

9. The process of making glue which consists in dissolving an amylaceous material by means of an alkaline digesting agent and water, the amount of water being such that a wood glue is formed as distinguished from mucilages, sizes and paste."

[Matter enclosed between rules erased in copy.]

Claim 15, line 1, cancel the first word "The" and insert "In The."

Same line, cancel "which consists" and insert "the combination of the following steps."

Same claim, line 2, cancel "in."

Same claim, lines 5 and 6, cancel "to produce a glue for application."

Claim 16, line 1, change "The" to "In the."

Same line, cancel "which consists" and insert "the."

Same claim, line 2, cancel "for."

Same line, after 'agitating' insert "of."

[*Words and figures enclosed in brackets erased in copy.]

Claim 18, line 5, cancel "alkali earth metal hydroxide" and insert "its equivalent."

Claim 19, line 1, change the first word "The" to "In the."

Same line, cancel "which consists" and insert "the combination of the following steps;"

Same claim, line 2, cancel "in."

[fol. 1127] Remarks

We call the attention of the Office to the fact that the last two actions on the Office have been addressed in the name of "Frank A. Perkins" instead of "Frank G. Perkins," the latter being the inventor's correct name.

The Examiner criticises claims 1 to 3, stating they contain no positive step that differentiates them from one another. It will be noted that claims 1 and 2 are limited to cassava, while claim 3 is not. This makes claim 3 materially different in scope from claims 1 and 2, so that we submit the criticism does not apply to claim 3.

Claim 2 we believe is materially different in scope from claim 1, in that it specifies that a material portion of the carbohydrate be left insoluble in water. Of course it is true that as applicant alters the polymerization as is done in the preferred embodiment of the invention, a material portion is left insoluble in water. Nevertheless, we believe applicant is entitled to a claim with this limitation specifically set forth in the language of claim 2, and to have such a claim even although a claim is in the case which is limited by the statement that the polymerization is altered. As the claims read, the result obtained is necessarily a part of the process, and the process must be carried out so that substantially the result stated in the claims will be obtained, or otherwise the claim will not cover the process, that is, these statements which the Examiner terms statements of result, we submit, are limitations in the claim, and if they differ in scope it means that the claims differ in scope. We therefore believe, as far as these criticisms are concerned, that claims 1 to 3 are clearly allowable.

[fol. 1128] The Examiner states that in claim 1 this result is hypothetical. We assume that by this the Examiner

means the same criticism he raised in the official action of April 29th, 1911, where he stated that some of the claims are drawn to theories not capable of demonstration, as the theory of polymerization. We answered this criticism in our amendment of July 8th, 1911, and pointed out on pages 17 and 18 that such claims ought to be clearly allowable. We believe the Examiner, on considering a claim which specified a hydrate in solution would not hold that it was hypothetical. Claim 1 is no more hypothetical, we believe, than a large number of claims drawn to chemical products or compositions of matter, most of which specify the compounds, as of a certain molecular aggregation, which is just as hypothetical and difficult of proof as applicant's statement of polymerization, in fact, we believe, more so. We refer the Examiner to our statements in this regard in the amendment of July 8th, 1911, and believe that with the explanation there given, he will consider claim 1 allowable, as far as this point is concerned.

The Examiner further states that the positive step of treating cassava carbohydrates with water and suitable chemicals is so indefinite as to be unpatentable. We do not see that there can be anything indefinite with respect to cassava carbohydrate, and we do not see that there can be anything indefinite with regard to the term "water." We therefore assume that the indefinite term which the Examiner has in mind is the term "suitable chemicals." In each of claims 1 to 3 we have amended this term so that we believe the Examiner will no longer criticise them on this point. But even with this amendment we believe the claims are of substantially the same scope as before. We do not [fol. 1129] quite clearly see why the term "suitable chemicals" should be indefinite, but with the amendments to these claims we believe there can be no criticism thereof. It is therefore believed that claims 1 to 3 are clearly allowable as amended.

Claim 8 is criticised in that the expression "suitably dissolved" is indefinite, the Examiner stating "since water alone will not dissolve the glue base" this claim has been rewritten so that it is believed the Examiner's criticism is entirely avoided. Of course, if water would dissolve the material under some conditions it would be a solvent thereof.

We are not quite clear as to the exact meaning of the Examiner's criticism of claim 9. However, this claim has been rewritten and slightly amended so that we believe it is now in a form acceptable to the Examiner.

Claim 10 is criticised as incorrect, the Examiner stating that it appears to set forth that unaltered cassava when treated with the caustic would give the glue product, and that the cassava must be modified before the alkali treatment is effective to produce a glue. In this regard we beg to state that it has been found that with some particular grades of raw unaltered cassava a product of some value may be obtained without first subjecting it to the treatment of the first step. It has been found, however, that without giving it the preliminary treatment the resulting glue product is very unreliable, and the results are not so satisfactory from a commercial standpoint as when the cassava is treated with the first step. With the above explanation we believe that the Examiner will see that claim 10 is correct as it stands.

[fol. 1130] Claim 15 is rejected as incomplete, on the ground that the treatment of modified carbohydrate with water alone is insufficient to complete the process. In this respect, we believe that applicant is entitled to a claim covering only a portion of the steps of the process, if such portions have any suitable novelty. In other words, if one has a process consisting of three steps he may have a claim covering only two of those steps, or in fact only one of those steps, if such contain the necessary patentable novelty, and such claims are not objectionable on the ground that the product would not be produced until all of the steps were carried out. We further believe that such a claim covering one or part of the steps validly, covers these steps whether or not they are used in conjunction with the remaining steps or whether or not it is found necessary to use the remaining steps not mentioned in the claims. We believe that one is entitled to claims of this character just as well as one is entitled to sub-combination claims in a machine application. Claim 15 has been amended so that we believe it falls clearly in line with the above argument.

The Examiner rejects claims 16 and 19 on similar grounds, and these claims have both been amended, and we believe, are both clearly allowable for the same reasons.

The Examiner asks where is the warrant for the inclusion of the expression "alkali earth metal hydroxide" in claim 18. We believe that the specification gave ample warrant for the inclusion of this term, but we have stricken out this expression from the claim and inserted what we believe an equivalent expression, but which is not open to the criticism of the Examiner, and we therefore believe [fol. 1131] that the claim as it now stand is clearly allowable.

The Examiner states that product claims must be defined in such terms that the product would carry its own marks of identification by which a competing product could be determined to be an infringing product. We believe this statement is too broad, and that while it may be true with respect to some inventions, it certainly is not true with regard to all inventions, and we believe it is not true with regard to the present invention. We give below cases in which the courts have passed upon claims similar in character to applicant's claims, and in which no criticism whatever has been made upon the ground stated by the Examiner. The Examiner refers to claim 29, for example, and asks what is there in the definition of this claim by which the product itself could be distinguished so as to identify other products as infringing. In the first place the claim calls for a glue. We believe that one skilled in the art of glue making, or the use of glue, would have no trouble in determining that a certain product was a glue, especially if he saw it used for the common purposes for which glue is used. The next limitation in the claim is that it comprises cassava carbohydrate. While of course it might be difficult by merely looking at the glue to determine whether or not it contained cassava carbohydrate, yet the ordinary chemist's analysis would determine whether or not it comprised a carbohydrate, and such chemist's analysis is most often used, and is a proper means for determining whether a product contains certain elements, or the elements called for by a patent claim. The proof of the use of a cassava, while it might be difficult to obtain is nevertheless, very readily possible. It is probable that in most cases minute [fol. 1132] quantities of the cassava which have not been dissolved will be found in the joint, and a microscopic examination of this will probably give good evidence of cassava

if cassava be used. The testimony of parties who made the glue, or saw it made, could be obtained, and this testimony, together with testimony showing where the base originally came from, would very clearly prove that the glue comprised cassava carbohydrate. The next limitation is that it be rendered semi-fluid. We do not see any particular difficulty in determining this as any one skilled in the art could determine, we believe, even at a glance, that the glue was semi-fluid. That it was rendered so by digestion could also be proved by the testimony of those who manufactured it. The further limitation that it have substantially the properties of animal glue could readily be ascertained by tests for that purpose, made by one skilled in the art. Such tests as these often have to be resorted to in determining whether an article infringes a product claim, and also testimony as to the actual process carried out in making the product, has to be given in order to determine just what the product is. We know of no case where the courts have refused to admit such testimony for any such reason as given in the Examiner's action.

The Examiner further states that again, some of the product claims are defined in a large part, by the process of making, as claims 25, 27, 30 &c., and this is objectionable. We agree with the Examiner that if the actual invention of a product can be fully and sufficiently set forth to amply cover the invention by terms which do not specify the process by which the product is made, then such method of claiming the invention is the proper one. But we further submit that it is the well settled practice of the Office that [fol. 1133] when an invention cannot be adequately covered by a product claim without bringing in certain elements of the process by which it was made, then it is perfectly proper to recite such elements of the process in the product claim.

Away back in the 90's Commissioner Simonds came to this conclusion, and stated that when a man has made an invention his right to a patent for it, or his right to a claim properly defining it, is not to be determined by the limitations of the English language.

Claims similar to applicant's have been before the court many times, and we know of no case in which a claim has been held invalid or objectionable for this reason.

In Pickhardt et al. vs. Packard et al., 22 Fed. Rep. 530, the Court considered a product claim which defined the product both by its chemical composition and the manner and materials from which it was obtained. This claim, which was sustained, was as follows:

"As a new manufacture, the coloring matter, or sulpho-acid of dinitro-alpha naphthol, obtained from the action of nitric acid upon the within-described alpha-naphthol sulpho-acids, substantially in the manner set forth, or by any other method which will produce a like result."

In other words, the product was defined in part by its chemical composition, in part by the materials from which it was obtained, and in part by the process by which it was obtained. We know of no case in which any objection was made to such a claim on the grounds stated by the Examiner.

[fol. 1134] In the case of Badische Anilin & Soda Fabrik vs. Kalle et al., 94 Fed. Rep. 163, the Court considered several claims also similar to applicant's, the first claim stating that the article of manufacture resembled indigo, just as applicant's claims state that applicant's product has the properties of animal glue. These claims were sustained by the Court of Appeals and were as follows:

"(1) As an article of manufacture a coloring matter lake resembling indigo in color, which can be obtained by combining a soluble safranineazo-naphthol body with a tanno-metallic mordant and which is very fast to light and washing; upon suitable reduction it shows the reactions of safranine, upon treatment with caustic soda it shows the reactions of tannin and it contains a metal, substantially as described.

(2) As an article of manufacture, the hereindescribed blue dyestuff which can be obtained from a safranine-azo-naphthol and which may be recognized by the following characteristics: It is soluble in water, upon reduction with stannous chloride and hydrochloric acid, amido-naphthol is produced and upon reduction with zinc dust and acetic acid a safranine is produced, substantially as described.

(4) The specific blue coloring matter (obtainable by rendering the safranine-azo-beta-naphthol hereinbefore mentioned soluble in water) which possesses the following char-

acteristics: It is soluble in water, gives a blackish-green solution in sulphuric acid and on reduction gives alpha-[fol. 1135] amido-beta-naphthol and safranine proper, all substantially as described."

The claims before the court further specified the method of obtaining the product and certain tests which could be applied to it to indicate that it was the product. If these limitations in these claims conform to the rules laid down by the Examiner, then certainly applicant's claims do. We believe, however that although the general rule is as stated by the Examiner, i. e., a product should not be claimed by the process of making it, nevertheless this case falls within the exception, as many other cases have before, and that claims 25, 27, 30 &c., are clearly allowable as they stand.

We had thought that the claims to the joint would describe the resulting product in terms such that it would be easy to prove infringement of them, and in terms which did not refer to the process, but the Examiner has held that the joint is an independent invention, by his requirement for division, so that we believe that the only language left in which to describe the invention of the product is that used in the present product claims.

The Examiner states that other product claims are defined in part upon an hypothesis, as claim 26. We assume that the Examiner is referring to the statement in claim 26 that the so-called amylo-cellulose coating has been partially but not entirely converted. We believe that the claim is not objectionable for this reason, and that the claim is not defined in part upon an hypothesis any more than the claims before the courts in the above mentioned cases.

Our argument above with regard to claim 1, and the results of chemical analysis and tests which have been before submitted to the Examiner, we believe, show that the claim [fol. 1136] is clearly allowable.

The Examiner states still other claims are defined in part upon an alleged superiority, as claim 28. We are unable to see that claim 28 is in any way based upon an alleged superiority. The Examiner is apparently referring to the statement that the proportion of cellulose is greater than in the natural material. This is a statement of actual content of the product, and we are unable to see that it is in any way a statement of superiority. If a claim specified that it had

more than a certain percentage of a certain ingredient, we believe the Examiner would not hesitate to hold that it was proper in form as far as this point is concerned. Applicant's claim is just such a claim, the phrase in question merely defining the amount of so-called cellulose in the resulting product. The Examiner's illustration with respect to a motor having a higher horse power &c. may be correct, but we believe it is not analogous to applicant's case, and does not apply to claim 28.

The Examiner notes that in claim 37 the definition is based upon characteristics of the product that are no longer existent. Of course this is true, but we believe it is perfectly proper to define the product in this way, especially in view of the cases above cited. We believe that a claim specifying in combination with other elements, a product having therein granulated sugar and water would be a proper claim if the use of granulated sugar was an important feature in the invention. It would, however, be true that immediately the granulated sugar was placed in the water it would no longer be granulated. In the same way, a particular composition of matter might be described as composed of yellow paint and blue paint, with other materials, and yet when mixed together neither of the paints [fol. 1137] would remain yellow or blue. We therefore submit that claim 37 is clearly allowable.

For the reasons above given we believe that claims 24 to 39, and 41, which were rejected upon the grounds stated, are clearly allowable.

The Examiner states that the inconsistency in claim 27, with reference to the expression "three times," has not been corrected. We pointed out in our amendment of August 2nd that claim 27 merely states that it shows a viscosity between that of cold water and three times that of cold water, and in this respect it was like former claim 4. We do not now see that there is any inconsistency in claim 27, and if the Examiner still adheres to his criticism we ask him to more clearly point out the same.

In view of the above a reconsideration and favorable action on the case is earnestly solicited.

Respectfully submitted.

Kenyon & Kenyon, Attorneys for Applicant.

[fol. 1138] Div. 31, Room 169

2-260

Paper No. 20

Address only "The Commissioner of Patents, Washington, D. C." and not any official by name.

All communications respecting this application should give the serial number, date of filing, title of invention, and name of the applicant.

Department of the Interior,
United States Patent Office,
Washington, Nov. 11, 1911.
Mailed " " "

Frank G. Perkins, Care Kenyon & Kenyon, 49 Wall St., New York, N. Y.:

Please find below a communication from the Examiner in charge of your application No. 460,737, Adhesives and Method of Making the same, filed Nov. 2, 1908.

E. B. Moore, Commissioner of Patents.

This case has been reconsidered in view of the amendment of Oct. 24, 1911.

Claim 1 is still objectionable in the reference to polymerization in the "whereby" clause. Claims 1-3 are all objectionable in the expression "acid or its equivalent." What is the equivalent of an acid and where in the specification is there warrant for the claimed equivalency? Claims 1-3 are again rejected.

In claim 8 the statement of distinctions over the references by means of negative characteristics is objectionable. The claim is again rejected.

The criticism of claim 9 in the last office letter was intended to convey the idea that process claims must differentiate from the prior art (in this case the Higgins [fol. 1139] patent, for example) by difference in steps, which steps are necessary to produce the desired product. As drawn, this claim has no steps as distinguished from Higgins, and the rejection of the claim is repeated.

Where in the original specification is the warrant for a claim involving the formation of applicant's product without the preliminary treatment of the material with acid? The statement found on page 8 of the substitute specifi-

cation on this point should apparently be cancelled as involving new matter. Claim 10 is rejected on the ground of new matter.

It is not seen that the steps recited in claims 15, 16 and 19 are sufficient to produce the glue claimed. These claims still appear incomplete and even if it were granted that the steps are novel that is insufficient to warrant patentability, since their novelty must be supported by utility. These claims are again rejected.

Applicant has apparently only established that the alkalies are capable of dissolving the glue base to form the glue. Accordingly the expression "a solvent of cellulose," used in claims 25, 36 and 37, is too broad under the doctrine set forth in the case of Matheson v. Campbell, 79 O. G., 686, which doctrine has been recently upheld in re Dosselman & Neyman, 167 O. G., 983. These claims are therefore rejected on the above noted decision.

Applicant is not seen to have overcome the ground on which claims 24 to 39 and 41 were rejected in the last office letter, and this rejection is therefore repeated.

Ely, Examiner.

W. W. H.

[fol. 1140] Application Room, Nov. 24, 1911, U. S. Patent Office

U. S. Patent Office, Received Nov. 28, 1911

Division 31, Paper No. 21

Serial No. 460,737

H

In the United States Patent Office

In re application of Frank G. Perkins. Serial No. 460,737. Filed Nov. 2, 1908. For Adhesives and Method of Making the Same

#49 Wall Street,
New York, Nov. 23, 1911.

Hon. Commissioner of Patents, Washington, D. C.

Sir: In response to the Official action of November 11th, 1911, please amend the above entitled case as follows:

Page 3, line 18, after "diluted" insert the following:

H'. The reagent I use I call a starch converting agent because it is believed it exercises, at least in part, a hydrolizing or oxidizing or converting action similar to that of the well known starch converting agents many of which have been used to convert starch into soluble starch and dextrin. I may use any suitable starch converting agent but the action I produce is preferably much less complete since it is not my object to convert the starch wholly but only to effect its physical properties when put into solution or dissolved to form glue.

Page 5, line 5 from the bottom, change "o" to and.

[fol. 1141] Page 3, line 22, change "carbohydrate" to starch.

Page 9, line 2, cancel "or potato."

Page 5, lines 6 and 7, cancel "to very material extent if not altogether."

Page 5, line 5, cancel "into soluble starch or."

Page 9, line 5, after "carbohydrate" insert and with other starches and conversion products (starchy carbohydrates).

Page 12, line 18, after "use" change the period to a comma same line, cancel "I have found."

Same page, line 19, after "surfaces' change the period to a comma: same line, change "Its" to its: line 24, after "viscosity" insert is lasting and

Page 10, cancel lines 22, 23, 24 and 25 and insert the following:

H". Cls. 1-3, 8-10, 15-16, 19, 31

The carbohydrate glue base in the preferred form retains substantially unchanged the size and general form of particle as viewed under the microscope when treated with cold water, and produces opalescent cloudy solutions with water at 200° F.

Page 5, line 4, from the bottom, after "use" insert the following: but such other starches or starchy products may be used with more or less success.

Page 5, line 14, after "yielded" insert The batch therefore has not been converted into dextrin.

Page 5, line 15, after "acids" insert as well as other starch converting agents.

Page 12, line 17, cancel "My" and insert In the preferred form described my.

Page 8, line 2, cancel "traces of."

Rewrite claims 1, 2, 3, 8, 9, 10, 15, 16 and 19 as follows:

H³. 1. The process of making a glue base which con- [fol. 1142] sists in agitating cassava carbohydrate with water and a starch converting agent whereby the polymerization of the carbohydrate is altered to a point such that when dissolved it will form a viscous semi-fluid unjellified product adapted to be applied by machinery.

2. The process of making wood glue which consists in taking suitable carbohydrate material and properly proportioning the viscosity, cohesiveness and adhesiveness of the carbohydrate material resulting when it is dissolved to form glue applicable by machinery and then dissolving the carbohydrate material with a solvent of cellulose to put it into solution to form glue.

3. The process of making a glue base which consists in agitating a starchy carbohydrate with water and a starch converting agent to decrease the water absorptive properties of the carbohydrate to properly proportion the viscosity, adhesiveness and cohesiveness resulting when the base is dissolved to form glue properly for the application of the glue by machinery.

H⁴. 8. A glue base characterized by the facts that it is prepared from starchy material, retains substantially unchanged the size and general form of particle when treated with cold water, and produces opalescent cloudy solutions with water at 200° F.

9. The process of making glue which consists in treating starch below the bursting temperature of the starch, with a digesting agent such as caustic and water until the materials assumes a viscous

semi-fluid consistency adapted to be applied by machinery.

10. The process of making glue which consists in dissolving cassava carbohydrate in caustic alkali until a glue is formed as distinguished from muci- [fol. 1143] lages, sizes and pastes.

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H[5]. 15. In the process of making wood glue, the combination of the following steps, agitating a starchy carbohydrate with a digesting agent to decrease its water absorptive properties without converting the batch into dextrin, and then substantially dissolving the product thus produced with about three parts or less of water until the resulting product has a consistency such that it is applicable to glue up veneers.

16. In the process of making wood glue, agitating a starchy carbohydrate with a digesting agent until a sample of the material taken from the batch and dissolved will show a viscosity, adhesiveness and cohesiveness substantially equal to animal glue.

H[6]. 19. In the process of making wood glue, the combination of the following steps, agitating a cassava carbohydrate with a digesting agent to decrease its water absorptive properties without rendering the carbohydrate materially soluble in cold water and then putting the product thus produced into a solution containing about three parts or less by weight of water to produce a glue for application.

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[Matter enclosed between rules erased in copy.]

Claim 4, line 2, cancel "or its equivalent."

Claim 6, line 2, cancel "or its equivalent."

Claim 11, line 3, cancel "or its equivalent;" line 4 cancel "soda or its equivalent" and insert alkali; line 7 cancel "soda used" and insert alkali used, calculated as NaO H; lines 8 and 9, cancel "or the equivalent weight of its equivalent."

Claim 12, line 3, cancel "or its equivalent."

[fol. 1144] Claim 17, line 6, cancel "caustic soda solution or its equivalent" and insert a solvent of cellulose.

Claim 18, line 2, cancel "or its equivalent."
Claim 20, line 3, cancel "or its equivalent."
Claim 22, line 2, cancel "or its equivalent."
Claim 23, line 2, cancel "or its equivalent."
Cancel claims 24, 38 and 41 and adjust the ordinals of the remaining claims.
Claim 29, former claim 30, line 3 before "about" insert in; line 2, cancel "or its equivalent."
Claim 30, former claim 31, line 2, cancel "direct."
Rewrite former claim 32 as 31 as follows:

H[7]. 31. A wood and fiber glue containing amylaceous material as a base dissolved without acid in about three parts of water or less, and being viscous, semi-fluid and unjellified.

Claim 32, former claim 33, lines 2 and 3, cancel "or its equivalent."
Claim 33, former claim 34, line 3, cancel "or its equivalent" and insert alkali.
Claim 29, former claim 30, line 1, cancel "a starchy carbohydrate" and insert starch.
Claim 12, line 3, cancel "a starchy carbohydrate" and insert starch.
Claim 18, line 5, cancel "or its equivalent."
Claim 22, line 3, change "and" to with.
Claim 17, line 2, cancel "a starchy carbohydrate or its equivalent," and insert starch.
Claim 17, line 5, before "water" insert cold.
Claim 34, former claim 35, line 3, cancel "soda or its equivalent" and insert alkali.
Claim 35, former claim 36, lines 1 and 2, cancel "or its equivalent."
Claim 36, former claim 37, line 3, cancel "or its equivalent."
[fol. 1145] Claim 37, former claim 39, line 2, cancel "or its equivalent and caustic alkali" and insert solvent of cellulose.
Claim 38, former claim 40, lines 4 and 5, cancel "caustic soda or its equivalent" and insert an alkali; line 6, before "viscosity" insert lasting.
Claim 4, at the end, insert applicable by machinery.

## Remarks

An interview has been had with the Hon. Examiner in which the Examiner's objections to the claims rejected have been thoroughly discussed.

With regard to claim 1, we understand from the Examiner's statements that the objection to "polymerization" in the "whereby" clause is that it is insufficient to indicate to what extent the process is carried. We have amended the claim to make it clearly indicate that the extent to which the process is carried is to a point characterized by a certain test. We understand from the Examiner that the limitation of the claim to such a test would be satisfactory.

With regard to the objections to claims 1 to 3, concerning the phrase "acid or its equivalent" we explained that the original specification stated that a suitable reagent which would decrease the water absorptive properties might be used. The original pages also stated that "many substitutes may be found" and contained claims drawn broadly to such a reagent, and at that time it was well known and clearly set forth in the literature that certain alkalies, acids, salts and elements affected starch in a similar way to sulphuric acid. Other acids besides sulphuric, mixtures of acids and alkalies had been used by applicant before the application was filed and applicant's [fol. 1146] co-pending application Serial No. 460,738, shows that applicant's contemplated the use of alkaline agents and sodium peroxide. The Examiner thereupon suggested that the term "starch converting agent" be used and claims numbers 1 and 3, have been amended accordingly, and claim 2 rewritten.

Claim 8 was objected to as including negative distinctive characteristics. Phrases specifying the characteristics in question by positive statements were submitted to the Examiner which appeared to be acceptable to him and these equal restrictions in positive form have been substituted in the claim.

With regard to claim 9 we understand the Examiner's objection to be that it does not distinguish from Higgins by difference in steps. We believe that the claim as amended now clearly distinguishes from Higgins, 579,827,

by difference in steps, since Higgins does not treat starch with caustic at all but only neutralizes the acid with the caustic. Furthermore Higgins does not treat with caustic below the bursting temperature of the starch. The claim as formerly submitted and as now submitted also specifies that the starch is dissolved by the caustic which Higgins does not show.

Regarding the criticism of claim 10, when it was explained to the Examiner that the claim was broad enough to include a treated cassava as well as an untreated cassava, we understood that the only objections then remaining were the inclusion of the unnecessary phrase "or its equivalent" and the description of the process by means of the result. The claim has therefore been amended to omit the phrase "or its equivalent" and to limit the continuance of the process "until" a certain point has been [fol. 1147] reached recognizable by certain characteristics. We understood this would meet the Examiner's objections.

Claim 15 was carefully taken up and discussed by the Examiner and his assistant and certain prior art, particularly patent No. 736,084, to Fuller, [who]* thoroughly discussed in connection therewith. The Examiner indicated that if the claim were amended to distinguish from the process in which the digesting agent converted the batch into dextrin, by including in the claim "without converting the batch into dextrin" he felt it would be allowable. The claim has also been amended to make it complete by specifying that the dissolving is carried to a point where the resulting product evidences a particular consistency.

Claim 19 has been similarly amended and should be allowed for substantially the same reasons.

Claim 16 is specific to the first step of the process, and is therefore complete as a sub-combination.

Claims 24, 38 and 41 have been cancelled. The Examiner objected to these claims merely on technical grounds and not on the ground that the subject matter thereof (as we intended it) was anticipated. We believe that the subject matter thereof is substantially covered by other claims and hence these have been dropped.

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[*Words and figures enclosed in brackets erased in copy.]

The examiner in his action has raised the question as to whether claims 25, 36 and 37 are not too broad because of the expression "solvent of cellulose." At the interview with the Examiner we pointed out that the phrase "solvent of cellulose" was used in the original specification and claims. Applicant of course used the term "solvent of cellulose" as illustrated by caustic alkali, in a sense to include that form solvent action such as occurs when a metal [fol. 1148] is dissolved by an acid, in which combination or change of the dissolved body occurs. The Examiner at once appreciated this and also the double function of the solvent, both upon the starch and upon the wood, and it was pointed out to the Examiner that there were a number of such solvents well known to the Examiner besides caustic soda and potash which would be expected to be applicable to applicant's process. Upon the apparent recognition by the Examiner that the phrase in question was a proper one and his suggestion that claims 38 and 39 be consolidated, we substituted the term "solvent of cellulose" for "caustic alkali" in present claim 37 (former claim 39) and cancelled claim 38.

Referring to the last paragraph of the Examiner's action of November 11th, 1911, with respect to former claims 24 to 39, of which 24 and 38 are now cancelled, we understood that the only criticism as to these claims (except to the phrase "or its equivalent," which has been cancelled from all claims) was that the distinguishing features of the claims must be such that the product itself would carry its own marks of identification, and must not be distinguished by steps of the process. At the interview with the Examiner each of these claims was carefully considered and discussed and it was shown that none of them was distinguished by steps of the process except claim 31 (former claim 32). This claim has been entirely amended to overcome this criticism. In this claim as now amended the terms "viscous," "semi-fluid" and "unjellified" are characteristics clearly determinable from the product. The amount of water and the amylaceous base may be shown to be present by analysis. The phrase "dissolved by caus- [fol. 1149] tic," etc. occurring in other claims are distinguishing features which may be determined from the

product itself. If dissolved it must be by something. Analysis would also show the character of the carbohydrate base and indicate what solvent it was dissolved by. If dissolved by acid analysis should show the presence of the acid, its neutralization products or its effects.

The Examiner stated that it would be desirable for us to briefly indicate here some tests which might be used to establish the character of the product as described in these claims. For instance with respect to present claim 24 analysis would show that the base was a carbohydrate. Mixture with water as directed would show that it had the characteristic of producing a semi-fluid mass, and tensile and cleavage tests would establish that this mass had substantially the adhesive properties of animal glue.

Regarding claim 25, examination under the microscope would clearly show the presence of amylaceous grains and an attempt to dissolve them in water would show their substantial insolubility. A determination of the so-called amylo-cellulose such as separation by malt diastase would show the presence of so-called amylo-cellulose which is universally admitted to form the outer coating of the grain, and simple tests, as for instance by bursting with heat under the microscope or by observing the relative opacity of mixtures with hot water would indicate the extent to which the amylo-cellulose coating had been converted.

Regarding claim 26, well known methods of organic analysis would show the presence of starchy carbohydrate and the entire claim is a detailed description of a test by which a product may be distinguishable.

[fol. 1150] Regarding claim 27, amylaceous grains may be determined as above, and cassava may be determined by the characteristic odor or by the form of the grain or by other peculiarities. The fact that the grain has been treated will be indicated as stated above in connection with claim 25 or by other tests, and analysis as indicated above for amylo-cellulose would show its presence in greater proportion than in natural cassava.

Regarding claim 28, it may be briefly said that its semi-fluid character will be obvious. That it can only have been rendered so by digestion is clear and that it has the properties of animal glue is determinable by direct comparison of these properties, such as adhesiveness, tensile strength, etc.

Regarding claim 29, we discussed most of the characteristics above. The action of the alkaline digesting agent has been found to differ from that of acid by the character of degeneration products produced which remain in the material and which may be taken to indicate that the agent is alkaline, and the amount of water is determinable by analysis.

Regarding claim 30, the presence of starchy carbohydrate, the amount of water and the alkali metal hydroxide may be determined by ordinary analysis.

Regarding claim 31, this has been commented upon above. (Page 9 of this amendment).

Regarding claim 32, the presence and insolubility of the starchy carbohydrate may be indicated by separating the same, as by precipitation, and testing its solubility in water, and the presence of caustic in excess may be determined by titration.

Regardnig claim 33, the same comments apply with the added remark that the presence of soda and its propor- [fol. 1151] tionate amount are also matters of simple analysis.

Regarding claim 34, we believe this is practically covered by the remarks above given.

Regarding claims 35 and 26, these resent the new phrase "a solvent of cellulose." By separating the starchy carbohydrate, the solvent of cellulose remains for examination, and it is believed that in the case of every such solvent no difficulty will be met in determining not only its individuality but the amount of it which has been present. The particular analytical method used would be indicated by quantitative tests which indicate the particular solvent of cellulose present.

Regarding claim 37, the above remarks apply, and we have the added characterizations of certain physical tests well known to the trade.

It is not intended by the above statements to say that all of these tests would be applicable to every case, but we believe it will now be apparent to the Examiner that some of them or others equally well known would serve to clearly establish the infringement of the product.

We believe we have thoroughly covered every point raised by the Examiner and amended the claims so that

every requirement of the Examiner as outlined in his action and by him in the interview has been fully met.

The Examiner has insisted that the phrase "or is equivalent" be eliminated as unnecessary, stating that applicant is entitled to equivalents. This phrase has therefore been cancelled from the claims with the understanding that applicant is entitled to cover by such claims equivalents of the elements which the phrase modified.

In view of the above a reconsideration and favorable action is earnestly solicited.

Respectfully, Kenyon & Kenyon, Attorneys for Applicant.

[fol. 1152] 2-181

Address only The Commissioner of Patents, Washington, D. C.

Serial No. 460,737

RP. Department of the Interior,
United States Patent Office,
Washington, D. C., Dec. 22, 1911.

F. G. Perkins et al., % Kenyon & Kenyon, New York, N. Y.

SIR: Your application for a patent for an improvement in Glue and Method of making the same, filed Nov. 2, 1908, has been examined and allowed.

The final fee, twenty dollars, must be paid not later than six months from the date of this present notice of allowance. If the final fee be not paid within that period, the patent on this application will be withheld, unless renewed with an additional fee of $15, under the provisions of Section 4897, Revised Statutes.

The office delivers patents upon the day of their date, and on which their term begins to run. The printing, photolithographing, and engrossing of the several patent parts, preparatory to final signing and sealing, will require about four weeks, and such work will not be undertaken until after payment of the necessary fee.

When you send the final fee you will also send distinctly and plainly written, the name of the inventor and title of invention as above given, date of allowance (which is the date of this circular), date of filing, and, if assigned, the names of the assignees.

On left margin: ☞ In remitting the final fee give the serial number at the head of this notice.

On right margin: ☞ Uncertified checks will not be accepted.

[fol. 1153] If you desire to have the patent issue to assignees, an assignment containing a request to that effect, together with the fee for recording the same, must be filed in this office on or before the date of payment of final fee.

After issue of the patent uncertified copies of the drawings and specifications may be purchased at the price of five cents each. The money should accompany the order. Postage stamps will not be received.

Final fees will not be received from other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office.

Respectfully, E. B. Moore, Commissioner of Patents.

6-1641.

[fol. 1154]

2-073

U. S. Patent Office, Feb. 9, 1912.

Serial No. 460,737

Division 31, Paper No. 22

I (Rule 78)

Department of the Interior,
United States Patent Office,
Washington, D. C., Feb. 7, 1912.

Petition

Application of Frank G. Perkins. Serial No. 460,737. Invention: Glue and methods of Making Same

This petition is referred to the Examiner in charge of Division 31 for recommendation.

In case he recommends adverse ly he will state his reasons therefor.

E. B. Moore, Commissioner of Patents.

[fol. 1155] Application Room, Feb. 5, 1912, U. S. Patent Office

Docket Clerk, Feb. 7, 1912, U. S. Patent Office

In the United States Patent Office

In re Application of F. G. Perkins. Ser. No. 460,737. Filed Nov. 2, 1908. For Improvements in Glue and Method of Making the Same. Allowed Dec. 22, 1911

#49 Wall St.,
New York City, February 5, 1912.

Hon. Commissioner of Patents, Washington, D. C.

Sir: It is requested that the above entitled application be amended as follows without withdrawing the case from issue:

Page 8, line 11, change "different" to "definite."
Page 10, line 3, cancel "that."
Page 10, line 20, after "but" insert "a product."
Same line, after "showing" cancel "a product."
Claim 37, line 1, after "base" insert "and a."

Remarks

The above changes merely correct certain formal errors in wording which by inadvertence were not corrected by the last amendment.

Respectfully submitted.

Kenyon & Kenyon, Attorneys for applicant.

Recommended for entry under Rule 78. Final fee not paid.

Feb. 8, 1912.

G. S. Ely, Exr., Div. 31.

Approved: Feb. 8, 1912. F. A. Tennant, Assistant Commissioner.

[fol. 1156]

2-327

$20 Received Feb. 20, 1912

Chief Clerk U. S. Patent Office

G

Memorandum

of

Fee Paid at United States Patent Office

(Be careful to give correct Serial No.)

Serial No 460,737 , 191

Inventor: F. G. Perkins

Patent to be Issued to

Name of Invention, as Allowed: Improvements in Glue and Method of Making the Same

Date of Payment:

Fee—$20.00

Date of Filing: Nov. 2, 1908

Date of Circular of Allowance: Dec. 22, 1911.

The Commissioner of Patents will please apply the accompanying fee as indicated above.

Kenyon & Kenyon, Attorneys.

Sent Patent to

Messrs. Kenyon & Kenyon

49 Wall Street

New York, N. Y.

C-1846.

[fols. 1157 & 1158] Nf 2/12/12

P 22-218

23-15

87 Oils, Fats, and Glue Adhesives.

1908

460737

Brief

Contents:

Print

Application papers.

1. Rejection ..... Dec. 12, 1908.
2. Amendment A ..... Nov. 30, 1909.
3. Rejection ..... Dec. 16, 1909.
4. Amendment B- ..... Aug. 15, 1910.

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|---|---|---|---|
| 5. | Letter | Sep. | 20, 1910. |
| 6. | Power of Attorney by Extr | Sept. | 24/10 |
| 7. | Admt. A | | |
| | Dec. 14, 1910 Amend't transferred to companion case 460738 | | |
| 8. | Letter | Jan. | 6, 1911. |
| 9. | Letter | Jan. | 12, 1911. |
| 10. | Letter | Jan. | 17, 1911. |
| 11. | Amend. C and Affidavit | April | 6, 1911. |
| 12. | Rej | Apl. | 29, 1911. |
| 13. | Amendt. D and affdvt- | July | 10, 1911. |
| 14. | Letter— | July | 25, 1911. |
| 15. | Amendt. E- | Aug. | 3, 1911. |
| 16. | Letter | Aug. | 31, 1911. |
| 17. | Amendt. F | Sept. | 6, 1911. |
| 18. | Rej. | Sept. | 22, 1911. |
| 19. | Amendt. G- | Oct. | 24, 1911. |
| 20. | Rej | Nov. | 11, 1911. |
| 21. | Amendt. H | Nov. | 24, 1911. |
| 22. | " I (Rule 17)- | Feby. | 5, 1912. |
| 23. | | | |

Title:

Improvement in Glue and
Method of Making the Same.

38 Claims

(87-17)

38 47 13 10 41

39 24 53 Claims

(Here follows specification No. 1,020,655, marked side folio pages 1159, 1160, 1161, 1162, 1163, 1164, and 1165.)

[fols. 1166 & 1167] STIPULATION RE TRANSCRIPT

It is hereby stipulated by and between counsel for the respective parties that the foregoing constitutes a correct and true copy of the proceedings, papers and exhibits as provided for in the hereinbefore præcipe-stipulation and constituting the transcript on appeal in said cause as made up pursuant to said præcipe-stipulation.

Gorham Crosby, Counsel for Plaintiff. James A. Watson, Counsel for Defendants.

Clerk's certificate to foregoing, omitted in printing.

# UNITED STATES PATENT OFFICE.

FRANK G. PERKINS, OF SOUTH BEND, INDIANA; GERTRUDE S. PERKINS, EXECUTRIX OF SAID FRANK G. PERKINS, DECEASED, ASSIGNOR TO PERKINS GLUE COMPANY, A CORPORATION OF PENNSYLVANIA.

## GLUE AND METHOD OF MAKING THE SAME.

Specification of Letters Patent. Patented Mar. 19, 1912.

1,020,655. Application filed November 2, 1908. Serial No. 460,737.

No Drawing.

*To all whom it may concern:*

Be it known that I, FRANK G. PERKINS, a citizen of the United States, and a resident of South Bend, county of St. Joseph, and State of Indiana, have invented certain new and useful Improvements in Glue and Methods of Making the Same, of which the following is a specification.

My invention relates to improvements in glue and the method of making the same, and more particularly to the manufacture of glue from carbohydrates containing amylo-cellulose or its equivalent.

In the well known method of making a "starch paste" the solid is mixed with water enough, to make, after tumefying, a paste of such viscosity or density that it can be easily applied. This mixture is then subjected to heat to rupture or burst the cellulose walls and this cooking to a considerable degree supposedly reduces the cellulose to soluble starch, particularly in the presence of soluble starch already in solution. To increase the body or viscosity small amounts of ammonia have been added prior to or after heating. Such pastes have not the necessary relative "tack," viscosity, cohesiveness and tenacity to spread and adhere properly when applied as wood glues. Such pastes in cooling also become extremely thick and jelly-like and are practically unsatisfactory for woodwork when originally made with water, or diluted after cooking, because water warps the wood and delays drying and the pastes do not set hard enough and are not dense and elastic enough when dry. If more water is added in an attempt to make it more fluid, the paste becomes so weak and diluted that it has practically no power and would be wholly unfit for most classes of work, especially wood joints.

Various objects of my invention are to provide a glue and a method of making the same from carbohydrates, which will not have the disadvantages just pointed out, but which will be exceptionally tenacious and powerful but still amply fluid for easy application, and which can be economically and easily produced.

A further object of my invention is to produce a glue which will have the great practical advantage that it may be practically used for the same purposes as the best animal glue, and possess certain great advantages of permanency to weather and temperature variations far superior to those of animal glue. As far as I am aware, such conditions have never been met by any prior adhesive made from a carbohydrate base.

A further important object of my invention is to produce an adhesive or glue base which may be stored or sold in a dry state and which may then be prepared for use by mixing up with or without the use of heat. Such improvements are of great practical and industrial advantage and importance and have been much sought. To do this I first take a carbohydrate of the proper kind, and treat it with a reagent to decrease its water absorptive properties in the sense that to render fluid the finished glue, comparatively little water will have to be added and the final glue will not thereby become seriously diluted. The reagent I use I call a starch converting agent because it is believed it exercises, at least in part, a hydrolyzing or oxidizing or converting action similar to that of the well known starch converting agents many of which have been used to convert starch into soluble starch and dextrin. I may use any suitable starch converting agent but the action I produce is preferably much less complete since it is not my object to convert the starch wholly but only to effect its physical properties when put into solution or dissolved to form glue. The effect of this treatment is also that it decreases the viscosity of the glue produced with a given amount of water without detriment to its "tack," quick adhesive properties and cohesion. As a base I prefer to use the starch secreted by the cassava plant, which has peculiar properties and advantages for this purpose. After being treated as above, the dried material may be mixed with a small amount of water and with a solvent of amylo-cellulose, such as caustic alkali, and a glue produced the strength of which when dry is superior to the lateral strength of wood fiber. The prepared glue is very stable in its physi-

cal condition, so much so, that it may be kept for days or even weeks after it has been mixed for application without fermentative change. By my process in its preferred form the glue is free from the complications which attend the use of an adhesive which must be cooked or warmed before use, or kept warm during use, and is more powerful than that which results from the treatment of starch in other ways. My improved glue when made in its best form and properly applied will not only tear away the wood at some point in the wood joint produced by the use of this glue, but will tear away the wood at many points whether with or against the grain.

Further objects, advantages and features will more clearly appear from the detailed description given below.

In carrying out one embodiment of my invention I take the cassava carbohydrate or flour in dry form and add at least an equal weight of water. The batch is then agitated and heated to about 130° F., which is below the bursting temperature of the starch. Then I slowly add from 2% to 3% by weight (of the raw carbohydrate) of strong sulfuric acid. This may be considerably diluted if desired before it is added. The same is kept in continual agitation. The agitation preferably produced by thorough stirring is continued for from four to six hours after the acid has been added and then the acid may be neutralized by the addition of a small amount of caustic soda or similar alkali. The acid acts upon the starch or carbohydrate to decrease its water absorptive properties. As the acid appears to remain unchanged in the batch, until neutralized. I believe it acts catalytically to change the molecular condition of the carbohydrate without rendering it substantially soluble in the water. However, great care must be exercised not to have the heat sufficient or the acid in such quantity as to put the starch or carbohydrate in solution. If the action of the acid and heat is carried too far the starch will be changed into dextrin, and will go into solution, and as such it would be lost to my process, as I utilize only the suspended material. Even this would cease to have the desired properties if the action were carried too far.

That a large part, if not all, of the starch does not, in my improved process, go into solution, is shown by its settling upon stopping the agitation and by the weight and analysis of the product yielded. The batch therefore has not been converted into dextrin. Sulfuric and other acids as well as other starch converting agents are stated to have a catalytic action affecting the molecular state of amylose or its state of hydration. This I believe to be promoted and equalized by prolonged agitation both together with the action of heat, removing constituents or destroying states of aggregation or polymerization, which are detrimental to the use of the carbohydrate as a glue base. The amount of alkali used is only enough to neutralize the acid. After this has been added, the batch is then cooled, drained and dried and kept in dry form until ready for use.

I find that the carbohydrate secreted by the cassava plant and known as cassava flour has many advantages over other starches and starchy products and prefer its use, but such other starches or starchy products may be used with more or less success. Other starchy products from the cassava plant are found to be more or less adaptable and even other starchy products may be used with some little success but they do not produce glues so tenacious and are otherwise more or less undesirable. Some are affected by impurities.

The above forms the first part of my improved process and the various steps therein may all be carried out at the factory.

In commercial use I preferably ship the dry material, obtained as above, to the consumer who carries out the second part of the process at the place where the glue is to be used, but if desired the first and second parts of my improved process may be carried out together.

In carrying out the remaining steps in the preparation of my improved glue, the dried base, obtained as above, is mixed with about three parts or less by weight, (of dried base) of water according to the strength of the joint and economy desired. The dried base does not materially go into solution in the water unless heat is applied, but a liquid suspension is thereby formed which is agitated and treated with a solvent of cellulose, as, for example, an aqueous solution of caustic soda or potash alkaline to phenolthalien, using if cold from six to ten per cent. of the weight of the dry base, of caustic soda or its equivalent of caustic potash. The alkali, I believe, acts chemically to unite with one or more starch molecules and with the water to form a colloidal compound. The alkali is best added in the form of a solution of from 33% to 50% strength. Sodium and potassium hydrates are the most available and among the most powerful of the known solvents of the starch cellulose and are well adapted for most purposes.

To take a specific example, a given quantity, say 200 lbs. of the dried amylaceous base was mixed with from 100 to 300 lbs. of water (preferably 225 lbs. or less). After the mixture was thoroughly agitated, 20 lbs. of caustic soda was added in a concentrated solution of approximately one part alkali in one to two parts water. This was added with extreme slowness, requiring 15 to 20

minutes for the 50 lbs. solution required. During this time constant stirring was maintained in order to equalize and distribute the action of the caustic soda as fully as possible. When normal temperatures were used the result has not been obtained with less than 6 parts of NaOH per 100 parts of amylaceous base. The result consists in what is called the passing over or "coming across" of the mixture and may be described as follows: During the earlier stages of the addition of the caustic in the above example, little difference in the appearance of the mass was apparent. Soon, however, it became creamy and then more pasty and difficult to stir. When about half the caustic soda had been added, there was faintly observable a minute mottled effect on the surface of the mass being stirred, and it gradually assumed a translucent porcelain-like appearance. If at this time a little of the mixture was squeezed between glass plates portions of the mixture were observed to be transparent and almost invisible. Other portions presented much the appearance of the original mixture of water and suspended particles of starch. As the addition of caustic soda proceeded accumulations of clearer matter occurred on the sides of the vessel and on parts of the stirrers and finally when the proper amount of caustic had been added, the entire mass "passed over" or "came across", being converted from a mixture of suspended starch and water containing caustic to a homogeneous colloidal compound of starch caustic and water. A little excess of caustic was preferably added to prevent decomposition of the compounds by the carbonic acid or moisture of the air. As much as fourteen per cent. NaOH, or the equivalent of other caustic may be used, leaving some free caustic in the prepared glue. The word "compound" is here used in the more modern chemical sense of matter connected within the limits of some quantitative relation to produce a definitely recognizable product having certain definite physical characteristics. It is found that temperature affects the amount of caustic required to produce this result and it is believed that as temperature affects the polymerizing or uniting power of the starch molecules, one with another, so it affects the ability of a smaller quantity of caustic to satisfy or bring across a given quantity of starch. It is found that at successively increasing temperatures one is enabled to bring across the mixture with successively decreasing proportions of caustic.

As previously stated, when ordinary starch is heated with water, it absorbs enormous quantities of water, and if only two or three parts of water are used becomes of a stiff jelly-like form which must be very much diluted before it will be practically workable. I find, however, that using my improved glue base and method of mixing the same, this water absorbing power can be greatly reduced and can be regulated, although the mixing is done with the same proportions of alkali and carbohydrate or else the same temperature, which have hitherto produced unworkable jellies or weakly adhesive pastes or mucilages. And by the use of cassava starch in particular, results can be secured entirely different from those hitherto produced, as stated by others, preferably with corn. Thus, by proper adjustment of conditions of mixing I am able to produce this glue even with certain grades of untreated cassava carbohydrate and with other starches and conversion products (starchy carbohydrates). The preliminary treatment, however, substantially reduces the absorption of water by the starch and prevents it from becoming jelly-like and tough when afterward treated either with the water as above indicated or with the alkali, or both.

In the second part of my improved process, less than about three parts of water by weight to one part of the dry material are used and after adding the solvent it is found that even with such a small amount of water, the batch will assume a semi-fluid consistency much superior to that ordinarily obtained by the use of water alone and will not become jelly-like and tough as in former processes. The alkali added acts, I believe, to dissolve more or less of the cellulose and carbohydrate, uniting with the same and with the water and forming a glue of very tenacious properties. The dry carbohydrate is mixed with the water with a carefully regulated heat, if any. The action of heat replaces the action of a portion of the caustic in transforming the glue base, as explained above. By the preliminary treatment in reducing the water absorbing power of the carbohydrate, a very concentrated mixture with water may be obtained.

Experiments indicate that after the carbohydrate base has been treated in accordance with the first step of my process, the proportion of amylo-cellulose in the carbohydrate granule has been increased. I believe this increase in the percentage or proportion of the amylo-cellulose in the carbohydrate allows of the same to be changed into a good glue with very much less water than would otherwise be required. One way which has been found quite satisfactory for determining when the action of the acid or its equivalent, and the agitation, have been carried far enough in the first step, is as follows:

When the carbohydrate glue base which has been dried has been boiled for ten minutes with dry live steam at 100 lbs. pressure with 9 parts of water and tested for vis-

cosity while hot, it showed a viscosity between that of cold water and three times that of cold water.

In specific examples tried, the carbohydrate base, subjected to the above test, has shown viscosities between that of cold water and three times that of cold water, but a product showing about two times the viscosity of water is preferred.

The carbohydrate glue base in the preferred form retains substantially unchanged the size and general form of particle as viewed under the microscope when treated with cold water, and produces opalescent cloudy solutions with water at 200° F.

When treated in accordance with my process, I find that the carbohydrate glue base may be formed into glue by using only from one to three parts of water, the more water used the greater the delay in drying. Preferably less than 4½ parts of water should be used in making the glue from the carbohydrate base.

I believe that the cause of the tenacious properties when carbohydrates are treated with water and a strong solution of an alkali may be traced to the proper proportioning of viscosity, cohesion and adhesion, together with the peculiar chemical action which caustic loosely combined or free in the glue as applied, exerts on the cellulose which it in turn combines with, in making the joint to form alkali metal carbonate, bicarbonate and acetate. I believe this proper proportioning is due to the partial change of the integument and the proper proportioning of the amylo-cellulose and the granulose (or the proper mean polymerization) when united with the caustic and water. Consequently, I believe that to obtain the best results it is necessary to abstain from reducing the cellulose to true soluble starch, and that sufficient cellulose must be left to make the glue amply tenacious. Therefore, the action of the acid and alkali should not be carried so far nor the temperature be so high as to destroy all the cellulose and impair its strength by changing it into soluble starch and the starch into sugar or dextrin. Also, in actual practice I have found that a good glue is produced by treating the base with the chemicals to reduce the water absorbing power to a point where the base if mixed with from 2 to 3 parts of water and subjected to heat of 170° F. would result in a syrupy condition instead of a thick jelly-like mass. I find that by such suitable treatment under my process it is possible to produce from the base long filaments having a strength similar to threads of animal glue. Practically all the water must be later removed that goes into the glue solution and is applied to the joints, hence an increase of water in the glue solution involves changes in drying methods, or in drying time, or in risks of injury to the material due to warping by the extra water, all of very serious consequence. The diluted or adulterated pastes hitherto made from the natural carbohydrates in the manner explained before are unfit for many classes of work and especially wood joint work, since they contain so much water or adulterants that it takes the joints very long to dry or when they do become dry there is so little binding material left that only a very weak bond is obtained. Thus it is of the greatest importance and value to produce a concentrated glue solution ready for application, which parallels the animal glue solutions now employed industrially, in respect to water contents and physical properties in application, and is equal or superior as to strength and permanency.

Certain advantages of my improved process may be obtained to some extent even although other materials be mixed with the amylaceous material to form the glue base.

In the preferred form described my improved glue is transparent and free from odor, and is very stable after mixing for use, it is instantly adhesive to clean surfaces, its cohesion is very great but not sufficient to overcome its adhesion and its viscosity is lasting and low enough to permit ready application, but so proportioned to its cohesion that it is capable of being applied by machinery like hide glue, but still very long tough fibers are produced if freshly joined surfaces are separated. I have found that, owing to the breakage of these filaments quick separation of such surfaces produces a crackle like electric sparks.

My glue will produce joints which are practically unaffected by natural humidity and which are unaffected by prolonged dry heat. In the preferred form it forms a joint with wood or other cellulosic material, which joint is distinguished from ordinary mucilages, sizes and pastes by the fact that it consists of the following layers in the order named, unaltered cellulosic material, cellulosic material altered by caustic, tough amylaceous material altered by caustic, cellulosic material altered by caustic and unaltered cellulose. This joint can probably be distinguished wherever found, by the shading of the above layers into one another when stained with iodin and examined under the microscope and by other tests. Glued up panels have been placed behind a radiator for 18 months without cracking or separating of the glue joint. These features make my glue especially advantageous for purposes in which other vegetable glues are practically useless.

Although I have described my improvements in great detail and with much particularity and have mentioned particular compounds which I prefer to use, I desire

it to be understood that I do not limit myself to such details and compounds, except as clearly specified in the appended claims, as many modifications and substitutes may be found; but,

Having fully and clearly described my invention with respect to one particular embodiment thereof, what I claim and desire to secure by Letters Patent, is:

1. The process of making a glue base which consists in agitating cassava carbohydrate with water and a starch converting agent whereby the polymerization of the carbohydrate is altered to a point such that when dissolved it will form a viscous semi-fluid unjellified product adapted to be applied by machinery.

2. The process of making wood glue which consists in taking suitable carbohydrate material and properly proportioning the viscosity, cohesiveness and adhesiveness of the carbohydrate material resulting when it is dissolved to form glue applicable by machinery and then dissolving the carbohydrate material with a solvent of cellulose to put it into solution to form glue.

3. The process of making a glue base which consists in agitating a starchy carbohydrate with water and a starch converting agent to decrease the water absorptive properties of the carbohydrate to properly proportion the viscosity, adhesiveness and cohesiveness resulting when the base is dissolved to form glue properly for the application of the glue by machinery.

4. The process of making a glue base which consists in agitating a starchy carbohydrate with water and suitable chemicals below the bursting temperature of the starch to proportion the viscosity, adhesiveness and cohesiveness resulting when the base is dissolved to form glue applicable by machinery.

5. In the making of adhesives, treating cassava flour with substantially an equal weight of water, heating the same to about 130° F. and adding about 2% or 3% by weight of strong acid slowly and with agitation, without rendering the flour materially soluble in water, then neutralizing the acid with an alkali after from 4 to 6 hours agitation.

6. In the making of a glue base, treating amylaceous material with a reagent to decrease its water absorptive properties, leaving a material portion of amylaceous material in the product insoluble in water.

7. In the making of adhesives, treating a suitable carbohydrate with water and a digesting agent without rendering the carbohydrate materially soluble in water, to decrease the water absorptive properties of the carbohydrate.

8. A glue base characterized by the facts that it is prepared from starchy material, retains substantially unchanged the size and general form of particle when treated with cold water, and produces opalescent cloudy solutions with water at 200° F.

9. The process of making glue which consists in treating starch below the bursting temperature of the starch, with a digesting agent such as caustic and water until the material assumes a viscous semi-fluid consistency adapted to be applied by machinery.

10. The process of making glue which consists in dissolving cassava carbohydrate in caustic alkali until a glue is formed as distinguished from mucilages, sizes and pastes.

11. The process of making a glue, which consists in treating a starchy carbohydrate with caustic alkali, and water, to dissolve the carbohydrate, the total amount of water used being about 3 parts or less by weight of the carbohydrate, the amount of caustic alkali used, calculated as NaOH being about 10% or less by weight of the carbohydrate so that a wood glue is formed, as distinguished from mucilages, sizes and paste.

12. The process of making a glue, which consists in mixing starch with water and caustic alkali to dissolve the carbohydrate, the amount of water used being about 3 parts or less by weight of dry carbohydrate so that a wood glue is formed, as distinguished from mucilages, sizes and paste.

13. The process of making a wood glue which consists in treating a suitable starchy product a material portion of which is substantially insoluble in water with a solvent of cellulose and about 3 parts or less by weight of water, to produce a glue having adhesive powers substantially as great as those of good animal glue.

14. In the making of glue, treating a suitable starchy product with about three parts or less by weight of water and adding a solution of caustic soda or other equivalent alkali using about 10% or less by weight of the caustic soda or its equivalent of other alkali to dissolve the product.

15. In the process of making wood glue, the combination of the following steps, agitating a starchy carbohydrate with a digesting agent to decrease its water absorptive properties without converting the batch into dextrin, and then substantially dissolving the product thus produced with about three parts or less of water until the resulting product has a consistency such that it is applicable to glue up veneers.

16. In the process of making wood glue, agitating a starchy carbohydrate with a digesting agent until a sample of the material taken from the batch and dissolved will show a viscosity, adhesiveness and cohesiveness substantially equal to animal glue.

17. The process of making wood glue which consists in agitating starch with a digesting agent to decrease its water absorp-

tive properties without rendering the carbohydrate materially soluble in cold water and then combining the product thus produced with a solvent of cellulose to produce a glue for application, thus proportioning the viscosity, adhesiveness and cohesiveness of the final glue.

18. The process of making wood glue which consists in agitating a starchy carbohydrate with a digesting agent to decrease its water absorptive properties and then combining the product thus produced with alkali and water to produce a glue for application having free caustic alkali therein.

19. In the process of making wood glue, the combination of the following steps, agitating a cassava carbohydrate with a digesting agent to decrease its water absorptive properties without rendering the carbohydrate materially soluble in cold water and then putting the product thus produced into a solution containing about three parts or less by weight of water to produce a glue for application.

20. The process of making glue, which consists in agitating a starchy carbohydrate with water and a digesting agent to reduce the water absorptive properties of the carbohydrate without rendering it materially soluble in water, then mixing the carbohydrate with water and caustic alkali, the amount of water used being about three parts or less by weight of dry carbohydrate, the amount of caustic used being about 10% or less by weight of dry carbohydrate, to dissolve the carbohydrate to form the glue as distinguished from mucilages, sizes and paste.

21. The improved glue process which consists in treating cassava carbohydrate with substantially an equal weight of water, heating the same to about 130° F., adding from 2% to 3% by weight of an acid, slowly, and during agitation, neutralizing the batch with an alkali after from 4 to 6 hours agitation, then cooling and drying the batch, then adding from 1 to 3 parts by weight of water, and then while being agitated treating the same with a solution of a caustic alkali using about 10% or less by weight of the dry alkali and applying the resulting product to surfaces with which the caustic is adapted to combine and forming a joint between said surfaces.

22. In the making of adhesives, treating a suitable starchy carbohydrate insoluble in water with water with a reagent to decrease its water absorptive properties but without rendering the carbohydrate materially soluble in water, then allowing the batch to dry, then treating the same with water and a solvent of cellulose such as caustic alkali to form glue.

23. In the making of adhesives, treating a suitable starchy carbohydrate with an agent having an acid reaction without rendering the carbohydrate materially soluble in water, to decrease the water absorptive properties of the carbohydrate and then treating the carbohydrate with a solvent of cellulose, thus proportioning the viscosity, adhesiveness and cohesiveness of the final glue.

24. A carbohydrate base for making glue composed of suitable carbohydrate which when mixed with about 3 parts or less by weight of water and a solvent of cellulose will form a semi fluid mass having substantially the adhesive properties of animal glue.

25. A base for making glue as distinguished from mucilages, sizes and pastes embracing treated amylaceous grains substantially insoluble in water and the outer so-called amylo-cellulose coating of which insoluble grains has been partially but not entirely converted.

26. A base for making glue composed of starchy carbohydrate or its equivalent which when boiled for 10 minutes with dry live steam at 100 pounds pressure with nine parts of water and tested for viscosity while hot will show a viscosity between that of cold water and three times that of cold water.

27. A base for glue as distinguished from mucilages, pastes and sizes, comprising treated cassava amylaceous grains in which the proportion of so-called cellulose is greater than in the natural material from which the base is derived.

28. A glue comprising cassava carbohydrate rendered semi-fluid by digestion and having substantially the properties of animal glue.

29. A glue comprising chiefly starch dissolved by a digesting agent alkaline to phenolphthalien and in about 3 parts or less by weight of water.

30. A wood and fiber glue formed of starchy carbohydrate or its equivalent in union therewith of about 3 parts or less by weight of water and alkali metal hydroxid.

31. A wood and fiber glue containing amylaceous material as a base dissolved without acid in about three parts of water or less, and being viscous, semi-fluid and unjellified.

32. A glue as distinguished from mucilages, sizes and pastes containing a starch carbohydrate base substantially insoluble in water and dissolved by caustic and containing free caustic.

33. A glue consisting of a vegetable carbohydrate base substantially insoluble in water and dissolved by water and caustic soda alkali, the amount of water being about three parts or less by weight of dry carbohydrate and the amount of caustic present being about 10% or less by weight of the dry carbohydrate.

34. A glue consisting of a vegetable carbohydrate base substantially insoluble in water and dissolved by caustic alkali, the amount of water being about three parts or less by weight of dry carbohydrate.

35. A glue containing a starchy carbohydrate base dissolved by a solvent of cellulose and water, the amount of water in the glue being about three parts or less by weight of dry carbohydrate.

36. A glue as distinguished from mucilages, sizes and pastes, consisting chiefly of a starchy carbohydrate base substantially insoluble in water and dissolved by a solvent of cellulose.

37. A glue composed of a starchy carbohydrate base and a solvent of cellulose and having such a character that it will be substantially unaffected by the natural humidity and having substantially as good adhering qualities as the best animal glue.

38. The process of making a wood glue which consists in suspending a glue base containing amylaceous matter insoluble in water in about three parts or less by weight of water and treating the base with an alkali properly proportioned substantially as described to produce a glue having a lasting viscosity to flow through pipes and the adhesiveness of animal glue.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FRANK G. PERKINS.

Witnesses:
GORHAM CROSBY,
EDWIN SEGER

[fol. 1168] SUPREME COURT OF THE UNITED STATES

ORDER ALLOWING CERTIORARI—Filed October 17, 1927

The petition herein for a writ of certiorari to the United States Circuit Court of Appeals for the Sixth Circuit is granted. And it is further ordered that the duly certified copy of the tanscript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

Endorsed on cover: File No. 32,737. U. S. Circuit Court of Appeals, Sixth Circuit. Term No. 285. Holland Furniture Company, petitioner, vs. Perkins Glue Company. Petition for writ of certiorari and exhibit thereto. Filed June 8th, 1927. File No. 32,737.

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